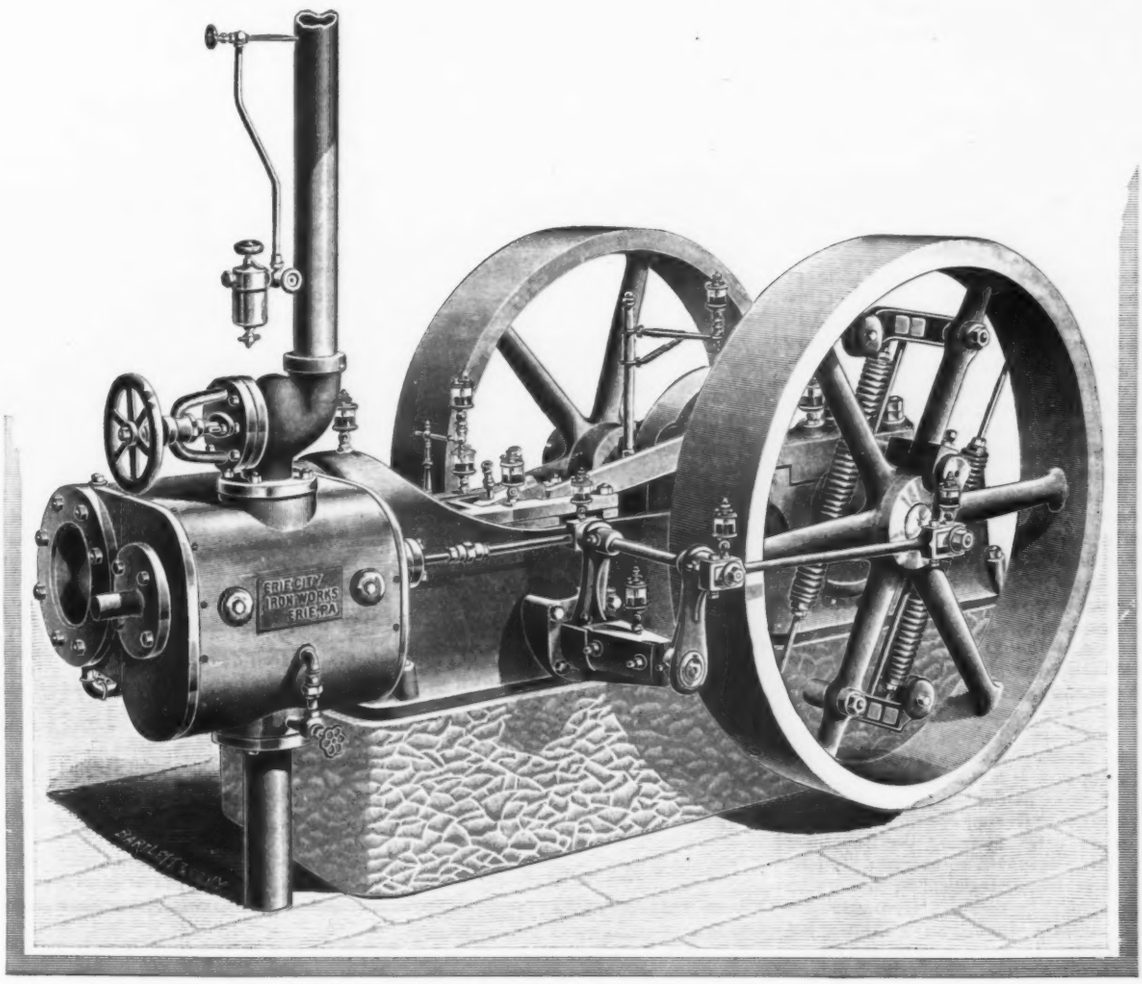
THE IRON AGE

THURSDAY MARCH 10, 1892.

The Erie City Automatic Steam Engine.

In *The Iron Age* of June 4, 1891, we presented an illustrated description of the new automatic cut-off steam engine built by the Erie City Iron Works of Erie, Pa. The engine remains as then constructed with the exception of the governor, the general design and arrangement of which have been considerably changed. Our engravings show the engine in perspective and the governor in detail. We shall, therefore, confine the present description to the governor, which is very simple in construction, remarkably steady in its operation and shows not the slightest tendency to flutter or race. It possesses the peculiar feature of increasing the lead of the valve very rapidly at the first change from extreme light load to medium load and then increasing very slowly from medium to heavy load, and also cutting off the engine entirely blind, and, in fact, giving it a slight negative lead at extreme light load, thus producing almost perfect regulation. It is, in fact, impossible to make the engine run faster under load than it does without any load.



AUTOMATIC ENGINE BUILT BY THE ERIE CITY IRON WORKS.

By referring to Figs. 2 and 3 it will be seen that as the weight arms B are thrown out or in by the movement of the fly wheel the rock arm G will be vibrated through the connecting links H, and that thereby the rock shaft F will be rocked, the crank arm will be rocked, and through the latter the crank pin D will be moved in the arc of a circle. It will be noted that the journal of the rock arm G—that is to say, the rock shaft F—is below or at one side of the center line A B. Therefore, the arc through which the crank pin D moves will be nearer to the vertical center line at its intersection with the line A B than it will at any point in its movement; the crank pin is carried toward the line A B when the weights move outwardly, and *vice versa*. Hence, when the load is put upon the engine and the weights move inwardly it will be seen that the engine increases its lead; if, on the other hand, the load is decreased, and the weights fly outwardly the lead of the engine will be decreased.

The arms B are formed with two slots, or openings, through them, the slots being at right angles to each other. The parts C H, which connect these weight arms, enter one of the slots, as shown in Fig. 3. Pivot pins pass through the other slot and the heads of these pins have their bearings on the outer sides of the weight arms. This brings the bolt of the weight arms upon the parts moved by them centrally in the arm. The arms are cut in the form shown and require no finishing before using except to prepare the journal opening of the inner end of the arm. The weights are cast solid with the arm, but they are added to by cap weights, which are bolted to them. The weight of these cap weights may be varied in order to adjust the governor in degree of speed. For example, we will suppose the right-hand weight, Fig. 3, to be marked 300, which indicates that that weight is intended to regulate the engine at 300 revolutions per minute. If it is desired to increase or decrease the speed of the engine, these 300 weights will be removed and the weight of proper weight will be substituted—as, for instance, a weight marked 275 or 325—as required. This obviates the necessity of changing the tension of the springs C in order to change the speed of the engine. This governor is the invention of Wm. O. Webber, general superintendent of the Erie City Iron Works. The governor has been put upon some 20 or 30 engines with most satisfactory results.

The Engineers' Society of Western Pennsylvania has decided to continue the discussion of the paper entitled "Smoke," read at its last meeting by Wm. Metcalf of Pittsburgh, at their next meeting, to be held on Tuesday evening, March 15. In view of obtaining all the technical data possible bearing on the practicability of preventing smoke, and the difficulties in the way of accomplishing the result desired in all cases, the society extends an invitation to parties, whether members of the society or not, having charge of or using mechanical stokers or smoke-burning devices, to submit brief

communications giving the results of their observations and experience. Such papers cannot occupy more then ten minutes in reading, and must be submitted to the board for acceptance on or before March 12, communications being addressed to the Engineers' Society, Academy Arts and Science, Fifth street.

A Compressed-Air Scheme.

If present plans are carried out in full detail, Chicago will have in the near future a central compressed-air supply for power, similar to the Popp system, used

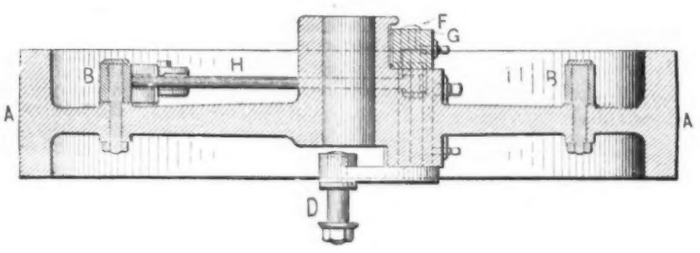


Fig. 2.—Section on Line A B of Fig. 3.

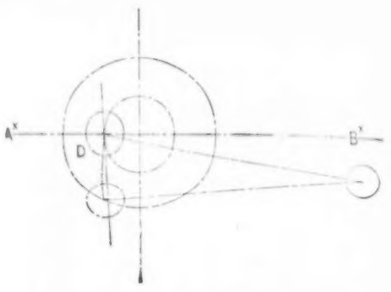


Fig. 4.—Diagram Showing Movement of Valve-Moving Crank Pin.

so successfully in Paris. The Chicago Power Supply and Smoke Abating Company have secured the passage of an ordinance through the City Council giving them power to pipe the streets for this purpose. John P. Bacon is president and manager of the company, and Fraser & Chalmers and ex-Mayor John A. Roche are interested, together with a number of other prominent citizens and capitalists. In an interview with William J. Chalmers, president of Fraser & Chalmers, he said:

"After full consultation with our lawyers, the firm of Fraser & Chalmers have decided to go into the enterprise. We go into it purely as a business undertaking, yet we believe, at the same time, that it will be one of the greatest improvements ever introduced in this city.

"We already have the money assured to capitalize the company, though not enough, perhaps, to swing the entire plant and put it into operation. All we are waiting for now is for Mr Bacon, the promotor, to bring us the franchise. We want it understood that we have nothing whatever to do with obtaining the franchise. If Mr. Bacon brings it to us clean and in proper form we will accept it, and go to work as soon as possible. Mr. Bacon is a mining engineer whom I have known for a good while. He gave us good references when this matter was first talked about. He has worked very hard on this enterprise, and does not want to sell his franchise if he gets it, but desires to stay in the company. I think he is all right. He has done some really wonderful work in preparing maps showing the location of steam and hydraulic power employed in this city. He has his maps, figures and everything ready for work. He shows that within the district bounded by the south branch of the river, Congress street and Michigan avenue 55 000 horse-power in machinery is employed. This can all be supplied by compressed air.

"The Paris plant supplies 32,000 horse-power. I took this matter up three years ago, and went to Paris to investigate. I regard it not only as a great thing for Chicago in the way of abating smoke and giving us a clean city, but it is also a great commercial enterprise, which would furnish work for our shops, covering 10 acres, for over a year. I am now in correspondence with Professor Rieller of Berlin, one of the world's greatest engineers, who, I think, will have charge of the mechanical department of this enterprise if we undertake it. In view of the newspaper talk about the ordinance, I wish particularly to mention that no street railway men or gas men, such as Mr. Yerkes, Mr. Wheeler, Mr. Parsons or Mr. Cummings, are in any way interested in this affair.

"We have a number of capitalists who stand ready to embark in this great enterprise. If we succeed and can furnish compressed air to the amount of 50,000 horse-power, that means an income, under the 5 per cent. clause, of $150,000 or $200,000 to the city. In view of this I do not regard the absence of a time limit in the ordinance as objectionable. Another thing. The streets would not be torn up, but 75 per cent. of the pipe would be laid in alleys, and the work would be done at night."

Ex-Mayor Roche is very enthusiastic over the scheme. He has made a study of the system, and has advocated it and talked about it in public places during the last four or five years.

"Mr. Chalmers presented the business side of this enterprise to me," he said, "and stated what the ordinance covered, and I agreed to go into it without hesitation. It is a great enterprise, and will be a great thing for Chicago. It would not cure the smoke nuisance, but would assist greatly in abating it. Those who stand ready to capitalize the company want practical men at the head of affairs who will invest their own money and assume the responsibility. The theory of this system is no new thing to me, and I am ready to invest my money in it. If this ordinance is not a proper one, the city ought to give us one that is. As soon as the enterprise is approved by the press, the public, and the Mayor, we are ready to go on with the work. We wouldn't pay one penny for a franchise. We say to the city: Give us an ordinance and you'll become a partner in our enterprise and receive 5 per cent. of the receipts. I am strongly in favor of this feature.

"The proposed system is in successful operation in Paris, and is to be introduced in Berlin. Printing presses, light machinery and elevators (the latter with the assistance of hydraulic power) can all be operated with compressed air. Possibly two power plants might be erected to start with.

"I do not regard it as practical to run street railways in Chicago with compressed air, and the talk on that line is foolish so far as this enterprise is concerned. Another fact worth mentioning is that we don't want anything to do with oil or illuminating or fuel gas through pipes, and we are very glad that right was excluded from the ordinance.

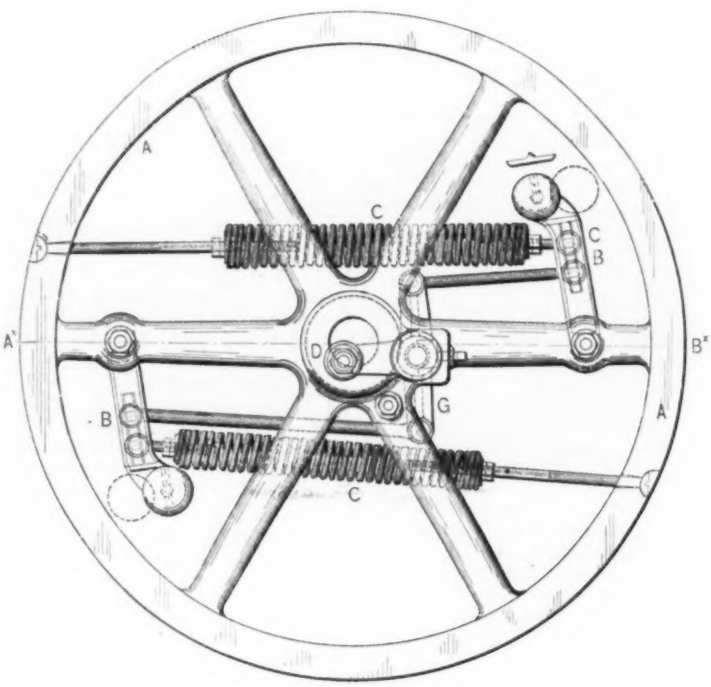


Fig. 3.—Side Elevation of Fly Wheel and Governor.

THE ERIE CITY AUTOMATIC STEAM ENGINE.

"Mr. Bacon has incorporated the company and done the preliminary work; and as soon as he brings us the franchise we will furnish the capital and see that the great enterprise is put into successful operation."

The Mayor has signed the ordinance since the above interviews appeared, although it was at first supposed that he would oppose it. The company can now proceed to business. It may be said in this connection that electrical engineers regard the proposition to depend on compressed air as a source of central power as a step backward. They insist that it cannot compete with electricity in either cheapness or efficiency. The advocates of compressed air, however, are enthusiastic in their belief that it is precisely the power adapted to the purposes of those located in the heart of a great city.

SMOKE CONSUMPTION.

William Metcalf on Smoke.

Before the Engineers' Society of Western Pennsylvania, of Pittsburgh, William Metcalf of the Crescent Steel Works read a paper on "Smoke," from which we take the following:

In dealing with a subject of such universal interest as smoke, engineers will pardon me for an elementary statement of the conditions of combustion, which is necessary for the information of any general readers who may wish to read our discussion of the matter.

The combustion of coal involves two processes—1, the conversion of the carbon to the condition of gas or vapor, and 2, the union of the carbon with the oxygen of the air. This union produces the intense heat so familiar to us all, and the product of combustion when complete is carbonic acid. In addition to this carbonic acid, water is produced by the burning of any hydrogen that may be in the coal. Any sulphur in the coal is burned to sulphurous or sulphuric acid, and any other combustibles are burned to their several oxides.

All of this seems very simple, and it is simple enough until we attack the practical part of it. The difficulty of mixing the gases to produce perfect combustion is so great as to be practically impossible; if we burn all of our carbon to carbonic acid we have inevitably a large excess of air going through our fire, and if we do not burn it all to carbonic acid in the few moments at our disposal in the furnace, there is a deficiency of air, and the excess of carbon is wasted in the form of carbonic oxide, half-burned carbon; or in vaporized carbon, which is thrown off with great rapidity in the dense black vapor which we call smoke.

Total Combustion Impossible.

In the intense heat of a fiercely burning fire our bituminous coal is vaporized with such great rapidity that it is impossible, practically, to burn it all before it flies to the chimney and passes beyond the reach of combustion, but much may be done by steady mechanical firing in small quantities at a time, to reduce the smoke nuisance, where the most intense heat is not necessary, and where other and more important matters do not make other methods of firing imperative. A flame of perfect combustion is not white, it is blue or a bluish white, somewhat of the color of the arc light. Such a flame is not a good radiator of heat and is therefore not so efficient for heating or melting purposes as the cooler white flame of imperfect combustion, which we know as the radiating flame. The carbonic acid, non radiating flame is excessively destructive; its cutting power on anything with which it comes in contact is amazing, when we see a furnace of the best refractories cut down and ruined in a few hours, which would endure a steel-melting heat for many weeks or months if it were subjected to a white radiating flame only.

Many of us know to our heavy cost and intense disgust how easily a careless or ignorant man can so burn up in a short time hundreds of dollars' worth of the highest refractories, and lay the whole plant idle for repairs. We cannot produce the soft, white, radiating flame without some smoke, because we cannot attain an exact balance of the gases, and therefore to maintain such a flame we must have a deficit of air, a surplus of carbon and some smoke.

The Use of Coke.

In operating a reverberatory furnace for melting, puddling or heating, the smallest loss from the perfect combustion flame is caused by the destruction of the furnace, the furnace contains in its charge of iron or steel something of far greater value than the fire brick, and the terrible oxidizing power of that flame can only be realized by those who have to wonder where their iron has gone, and to wonder why their losses in operating are so great and their profits are so small. Meanwhile the gentle "dickey bird" sits aloft on the blast furnace and whistles to himself softly, as his neighbor's losses come up the elevator in the shape of cheap ore. People call it slag. The bird sings ever so gently, "No smoke." "Use coke." There is no smoke from a blast furnace, because coke is used, but the vapors of a blast furnace are far more deadly than smoke, only they are white and so they do not count.

A beautiful illustration of the effects of the two flames we have been discussing may be seen by watching a puddler's operations. When he has scrap balls to cut down to make bottom, he rushes up his fires, pulls his damper wide open and draws in a great surplus of air. In a few minutes the little ends of the scraps grow white, and presently little globules may be seen dropping off here and there. They increase in number and in size until little streams are running down the pile, the whole pile is dripping and fades away to the last little lump, which the puddler pulls out because it would be a waste of time to cut it down. Melted iron? Not a drop, his furnace is never hot enough to melt wrought iron; it is melted oxide of iron, literally the iron burned up.

Clear Skies are Costly.

The bottom finished and set, he goes on with the well-known operations of melting and boiling until his iron comes to nature, and how different are his motions. The damper is adjusted to a nicety; a little more fuel is added until there is a surplus of carbon and a deficit of air; he gathers up the little grains and sticks them together into little balls, and these into larger balls, turning them repeatedly, keeping them covered with slag to prevent oxidation from any possible surplus of air or carbonic acid, and so, quickly and carefully, he makes up the balls to the right size and rushes them out of his furnace to the squeezers or hammer. Any oxidation now means loss of iron and consequent loss of wages, and hard toil wasted.

Don't let him make any smoke, though. What matter if his well-earned wages do burn up, provided we may have clear skies and, I was going to add, pure air, but we will come to that question later. With natural gas the common puddling and heating furnaces do not make much smoke, but the awful waste of gas is a sin, for which Pittsburgh is paying dearly now, and must continue to pay for many years to come. Did we have five years of comparatively smokeless puddling and heating in reverberatories? Then we used up 30 years' supply of the precious fluid in doing it. And some of us are still shooting it up our stacks in the same happy-go-lucky, devil-may-care style.

When we come to the regenerative furnaces one would say, naturally, here at least there is no excuse for smoke. Many of us thought so, and many of us tried it. I have seen hundreds of valuable crucibles cut down, and the furnaces cut down and destroyed, in the beautiful blue-white combustion flame, and yet the steel in the crucibles was not melted properly.

Tons upon tons of iron and steel have been wasted away in the same beautiful flame, and yet the masses were not heated through nor in condition to be worked. Now, the invariable rule is you must have a smoky stack, and the evidence of a well-run plant is that the stacks do smoke. It is a little odd at first sight that in these furnaces natural gas makes a little denser smoke than producer gas, but there is nothing singular about it when we reflect that it contains about four times as much carbon as producer gas.

Boiler Furnaces.

The most persistent smoker is the boiler, and the reason is obvious—there are no hot walls there to radiate back the heat or to aid combustion. The very object of the boiler is to destroy the fire and rob it of its heat as quickly as possiole; therefore, every particle of gas that comes unburned into contact with the boiler shell must float up the stack unburned, surplus of air or not, and add to the volume of smoke. The ordinary boiler fire goes through three stages; the freshly fed—when it pours out dense volumes of the blackest smoke and carries what heat there may be up the stack, and there is mighty little steam raised; the good burning stage—when there is a glorious fire, the boiler steams tremendously and at dangerous speed, and there is but little smoke; the perfect combustion stage—when there is a beautiful, clear fire, no smoke, and the surplus air is rushing along and carrying off so much heat that the water begins to rise and steam to fall. Then the weary fireman opens his doors, rattles out his ashes, shovels in another cartload of coal, shuts up his doors and lets her smoke, while he sits down to wipe off the sweat, and if he is a sensible fellow, to smoke a little himself.

Why Producer Gas is Not Used.

Why not use produced or water gas and prevent the smoke even if there is a little excess of air? There is no glowing iron nor delicate steel to cut down here. It has been tried in England, Scotland, Germany and even among the patient Dutch (how a Dutchwoman does hate smoke and soot!). They all gave it up, Dutch and all; and even here in Pittsburgh we tried it at an expense of thousands of dollars, and we thought we had it, but we were all mistaken. Is there no remedy, then? Yes, a partial one. The first stage can be eliminated entirely by good automatic stokers, but then the second stage of fierce firing cannot be reached, and on the whole probably more boilers would be required. That was the experience 30 years ago with the Meisner grate, probably as good a one as any of the more modern stokers; but that in the end would not be a hardship, because the more moderate and even firing would be so much easier on the boilers that the reduced repair bills would more than balance the interest on the increased cost. But these automatic stokers do smoke just a little, and they keep it up, so that our nuisance is only dilated, not abated. It is not quite so

nauseous in attenuated doses, still it must stink in the nostrils of prohibitionists.

With natural gas boilers may be fired smokelessly when gas is plenty. The favorite way with gas companies is, or was, to furnish 2 or 3 pounds of gas, a whole lot of squirt guns called air mixers, a lighted match, and then let her rip. Oh! how delighted they are, or were, with their perfect combustion and their smokeless fires. And oh! how they swore when they saw their big millions of feet consumed and their little piles of dollars received. There are, or were, no meters under the boilers.

The boilers under my charge were rigged that way at first, and the way they roared and rattled and vibrated and perfect combusted, and didn't make steam was a sight to behold once in a lifetime. And the way I shook and trembled with fear while that was going on was an experience to be endured not more than once in a life. After an expenditure of much time, some thought and considerable money, a partially regenerative fire was adopted by which with from 2½ to 3 ounces of gas we can keep up steam nicely, but singularly, when the gas is very low, when every atom seems necessary, then to keep up steam at all we must exclude any surplus air so thoroughly that now our boiler stacks smoke a little; only a little, still, they do smoke; and so the evidence of the best practice again is a little smoke in the stack.

The Loss by Smoke.

The next thing to consider is what do we lose by smoke. There are smoke-consuming devices advertised claiming savings in fuel of from 10 to 25 per cent. The best authorities I know of give the extreme of loss from smoke as 5 per cent., and the mean loss from average firing as 2 per cent. Therefore, if the devices mentioned do save from 10 to 25 per cent. of fuel they are misnamed; instead of being called smoke-consumers they should be named heat savers. That such saving over ordinary wasteful methods can be made there is no doubt, and if in doing so they save the 5 per cent. that goes as smoke and prevent the smoke, so much the better, provided that in furnace firing they do not burn up ten times this value in iron or steel or valuable refractories, or all three together.

Some Wastes of Heat.

Some years ago I had the honor to read before this society a paper on "Some Wastes of Heat," showing that an annual loss in this county of some $1,100,000 was fairly divided between wasted fuel and burned iron and steel. Although many improvements have been made since that time, it is probable, judging by the appearance of many stacks, that the same gross loss is going on in the country today. That money would be well worth saving, and it could be and would be saved, if our proprietors could be made to believe that there is such a loss. Through this want of belief, the loss continues. It is certain that the best and most economical appliances will produce a minimum of waste and a minimum of smoke, but not an entire absence of smoke.

Can smoke be prevented by the use of coke? Undoubtedly, if coke can be made without smoke. It would be hard to point out anything dirtier, or nastier, in the way of a smoke nuisance than a coke oven.

But coke is made out in the country, not in the city. Well, is not the country bigger than the city; with more people than the city? Is it not far more beautiful than the city and of much greater value than the city? What is art but a mean imitation of nature, and are we to daub and smear the whole face of nature to save a few puny works of art?

Let us have coke by all means, but first let us have it made without smoke; let us be at least decent to our neighbors while we are being kind to ourselves.

The Remedy.

If what has been said is correct, it may be a fair conclusion that some restrictive legislation wisely planned against excessive smoking might be good for the community; on the other hand, it would be equally fair to say that prohibitive legislation would be sure to defeat itself.

Naturally, one would ask here, has science reached its limits, can no more improvements be made?

By no means; everything is crude now when we study the possibilities of the future.

I will indicate two matters for our younger and more active members to think over: 1, sift the oxygen of the air away from the nitrogen; it is only a mechanical mixture of two gases and the problem is not insuperable; then with pure oxygen at command, setting aside all other wonders that may be worked, the second problem ought to be more solvable—namely, the direct conversion of the heat of fuel into electricity; that accomplished, the converse would follow as a matter of course, the conversion of electricity into heat; then we should have done with smoke, dirt, ashes, gases and all. But there is a health association after the smokers and we must consider the question of the health of the community as it is affected by the smoke. I assert that there is nothing particularly unhealthy about smoke; on the contrary it may mitigate other and worse evils. A reference to statistics will show that this city is not particularly unhealthy, but that, on the reverse, it enjoys a rather low death rate.

Smoke and Health.

A contemplation of the beautifully clear air of our Atlantic seaboard cities, the most beautiful cities in the world, is apt to fill a Pittsburgher's heart with envy; but in spite of clear air and balmy sea breezes, those cities are not healthier than we are. Their anthracite coal gives off as much carbonic acid, carbonic oxide, sulphurous acids and other poisons as it is possible to get from our bituminous coal. Who that has ever inhaled the burning, biting fumes of anthracite would not infinitely rather have a dose of our blackest smoke? Woe to the weak pulmonary organs that breathe anthracite fumes, there is no unctuous, protecting coat of soft, pure carbon to save them from torture and destruction A few years ago none but the most robust could hope to live in our windy, dusty lake cities. Why is it that we hear so little of those terrors nowa days? There is no difference except that we have sent them lots of coal, plenty of smoke and have painted and protected their bronchia and appurtenances with a generous coat of our all-protecting carbon.

The Russian naval estimates for 1892 amount to 17,882,233 roubles, or 2,991,961 roubles more than last year, which sum is to be spent upon the building of new ships. A large ironclad cruiser, of the same type as the Rurick, of 10,923 tons and 15,000 horse-power, is to be put upon the stocks at St. Petersburg this spring, in addition to three ironclads of 11,000 tons and several ironclad coast vessels of from 4000 to 5000 tons. It is also intended to build several small cruisers. As soon as the thaw sets in, says London *Engineering*, the two ironclad gunboats, the Otvajay and the Gremiastchy, of 1492 tons, and with a speed of 15 knots, are to be launched at St. Petersburg. The Rurick, now in course of construction, will be the largest cruiser afloat. She will be 426 feet in length, with a speed of 18½ knots, and will be able to go under steam from the Baltic to Vladivostock at a speed of 10 knots without coaling. Her armament will consist of four 8-inch guns, six of 6 inch, six of 5 inch, and four torpedo tubes, while her armor plates up to the water line will be 10 inches in thickness.

The Western Engineers.

The Western Society of Engineers met on the 2d inst., at 78 La Salle street, Chicago, with Isham Randolph in the chair. The most important decision reached was to join other societies in establishing in Chicago a technological institute to cost $250,000.

An invitation was given the society by O. Chanute, asking that it be represented at the Congress of Internal Navigation at Paris, France, beginning July 21, 1892. It was suggested that if the society were so represented it would bring the World's Fair closer to the French people. No action was taken on this.

A committee was provided for to make an exhaustive report at a subsequent meeting as to the use of steel in buildings, but the members are to be appointed hereafter by the president.

A report was read from Francis W. Parker, chairman of a committee of the Chicago Electric Club, proposing that joint action be taken by the Western Society of Engineers, the Chicago Electric Club and the Society of Architects of Chicago to establish in Chicago a high-grade institute of technology. The proposition made was that capitalists and philanthropists of Chicago would contribute liberally to the construction of such an educational institution, to cost $250,000, divided as follows: Physical laboratory buildings, $150,000; museum of mechanical arts, $50,000; additional equipments, $50,000. The report continued:

"The Chicago University has offered to start at once a complete technological institute and to furnish the necessary grounds gratis and to pay all expenses, such as salaries, if the citizens of Chicago will give to them the buildings above proposed and the apparatus and museum as above suggested. The university has already secured $150,000 for a chemical laboratory, and proposes to begin at once expending $15,000 annually in engineering courses. It will spend annually $10,000 in the mathematical department, $12,000 in the chemical department, $15,000 in the engineering department, and $37,000 yearly in what is properly technological education."

This was discussed favorably, and the president was authorized to appoint a committee of seven to act in this connection.

The president asked that the names of all members of the society who were posted on combustion and the prevention of smoke be handed him, that they might be given the secretary of the Society for the Prevention of Smoke, as that body desired to be put in communication with them.

The production of pig iron for 1891 in the German Empire, including Luxemburg, was 4,452,019 metric tons of 2205 pounds, as against 4,563,025 tons in 1890, or a decrease of about 2½ per cent., as compared with 8 per cent. in Great Britain and 9 per cent. here for the same time.

The baby Bessemer work of Walrand and Legénil at the foundry of the latter, 28 Passage Vancouleurs, Paris, consists of blowing a 550-pound charge for 8 to 12 minutes, adding 5 per cent. of 10 per cent. ferrosilicon, blowing again for 1 to 1½ minutes and casting.

Edge Grinding Machine.

In *The Iron Age* of February 25, 1892, we briefly described the works of the Tacony Iron and Metal Company of Tacony, Philadelphia, and mentioned that a machine had been designed for grinding the edges of long and thin pieces of cast iron used in making window frames. In order that the several parts forming the window will fit together with the proper degree of accuracy it is absolutely essential to have the edges perfectly straight. Before the introduction of this machine it was the custom to chip the edges, a costly and noisy task, and one by which the best results could not be attained. The machine has been found to do the work admirably, to be durable and easily handled, and to be economical, since it does the work of at least 12 men.

The machine consists of a long table to which the work is bolted and to and fro along one side of which passes a rapidly revolving emery wheel. This wheel is carried by a carriage arranged to move in suitable guides placed parallel with the table. It is driven by a belt passing around a driving pulley at one end of the machine and an idle pulley at the other end. The latter is arranged so that it can be moved toward or from the other in order to bring the belt to the proper tension. On the carriage are two guiding pulleys, shown in Fig. 3, which lead the belt to the pulley on the emery-wheel shaft. The carriage is moved along the edge of the table by a sprocket wheel and chain, indicated by the dotted lines in Fig. 2. Friction clutches, controlled by levers, impart motion to the chain and thereby move the carriage either forward or backward. The speed at which the carriage moves can be regulated to a nicety and the operator can, by the "feel," govern the speed according to the work being done by the emery wheel.

The piece to be ground is bolted to the table, with the edge to be ground projecting beyond the side of the table. By means of a hand wheel the table can be moved toward or from the emery wheel, as may be necessary. It is evident that this machine has a wide application and can be used to advantage upon work the edges of which must be straight.

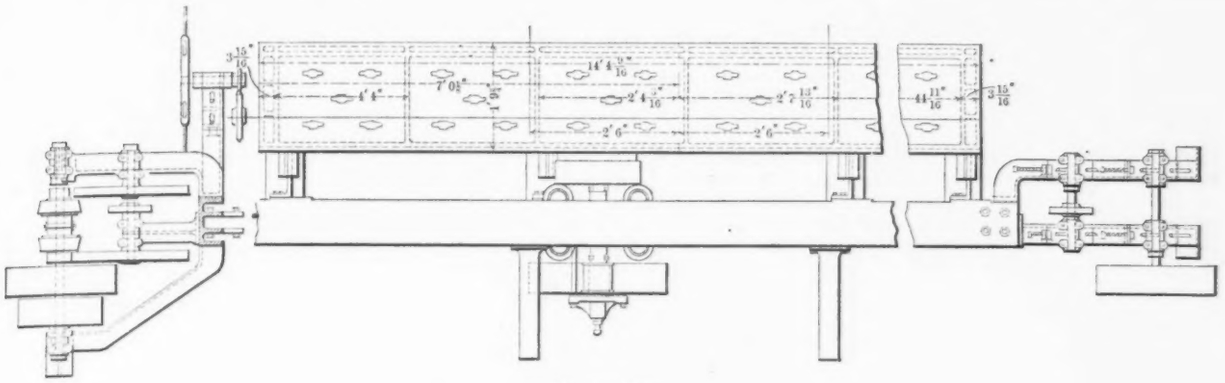


Fig. 1—Plan.

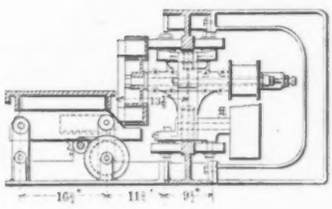


Fig. 2.—Cross Section.

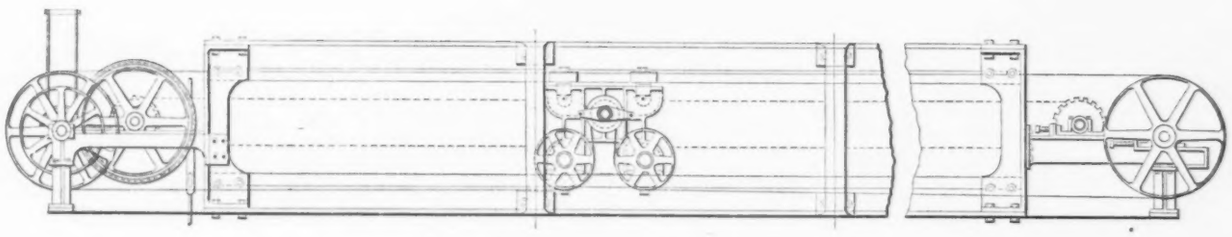


Fig. 3.—Front Elevation.

EDGE GRINDING MACHINE.

Whalebacks at Chicago.

The whaleback steamers have not been frequently seen on Lake Michigan, but the prospects now are that this summer they will be regular visitors to Chicago. It was announced last week that a contract for carrying 150,000 tons of iron ore from Two Harbors, Minn., to South Chicago had been closed with the American Steel Barge Company, owners of the whalebacks. The boats will make triangular trips, carrying coal from Buffalo to Duluth then loading iron ore at Two Harbors for Chicago, and finally taking grain thence back to Buffalo. The rate at which the iron ore is to be carried is not given out, but it is said to be not far from $1.30 a ton.

This is the largest contract yet closed on the great lakes for the transportation of iron ore during the coming season of navigation. The Illinois Steel Company are now planning to receive some 25 per cent. more ore at South Chicago next season than last, and there is, of course, considerable more to come from the Minnesota Iron Company's mines than is covered by the contract with the whalebacks. Some of it will be placed with a Milwaukee fleet, but a definite charter has not been closed.

The whalebacks have never carried grain out of Chicago, except in one instance last fall, when it was shown that such a vessel could cross the roof of the La Salle street tunnel with fully 100,000 bushels of corn and not touch. It is likely that they will take away over 7,000,000 bushels of grain during the season.

Triangular trips in which the whalebacks will be occupied have become quite popular with vessel owners, and several parties tried it last year with satisfactory results. It assures prompt dispatch in handling cargoes at all points, and largely avoids serious delays in trying to get to coal docks on the Chicago River.

It was also given out last week that the Steel Barge Company had decided not to build the monster passenger steamer at West Superior for service during the World's Fair in bringing passengers from Buffalo. It was argued that the boat, which would cost over $700,000, would have less than four months' business for the fair and no subsequent excuse for running, and the scheme was abandoned.

General Dyrenforth is said to claim that the experiments in Texas, in rain making, are not conclusive against his theory.

BLAST FURNACE SLAG.

Its Disposal and Utilization.

BY WILLIAM HAWDON.*

The disposal of slag by mechanical means engaged the writer's attention more particularly in the year 1885, when all the land available for slag tipping at the Newport Iron Works of Sir B. Samuelson & Co. at Middlesborough had been pretty well filled up. He then designed the apparatus shown in the accompanying engravings, of which Fig. 1 is a longitudinal view. A A are endless chains, made of long steel or iron links, which are fastened together by pins or rivets. B is the primary driving shaft, driven by a small engine, or if more convenient by a belt. At C is a pair of pulleys over which the endless chains pass; they are driven from the shaft B by geared wheels, and cause the chains to travel in the direction shown by the arrow. The pans which carry the slag are fixed on the chains, and are shown in cross section in Fig. 2. They are 90 in number, and are each made in three pieces, and are bolted on the chains A by means of two lugs cast on the bottom. The slag is conveyed from the furnace by means of the trough F, from which it flows in a molten state into the pans as they travel beneath it. The pans then pass through the water trough D, after which the slag is still further cooled by being sprinkled with water from the perforated pipe H. Finally in passing over the pulleys E the slag is tipped out of the pans into a shute discharging into wagons beneath. For taking up any wear on the chains, a worm wheel and screw, fixed at J, are connected by links K to the pulley shaft E, whereby the chain can at any time be tightened up as required.

At the Newport Works the eight machines are each driven by a steam engine with single 5-inch cylinder; but only above half its power is really necessary for driving them. The chains are run at slightly varying speeds, according to the output of slag, the average rate being about 13 feet per minute. The eight machines together deal with 1000 tons of slag per 24 hours. In the water trough D, into which the pans dip down with the chains after passing the bearing pulley G, the water is kept at a level reaching about two-thirds up the sides of the pans; and kept boiling by the heat, a certain portion of it usually splashes over into the pans and assists in cooling the slag; but this is not essential to the process. Two or three trucks are kept in reserve on a slight incline, so that when one truck is full another is lowered into its place without stopping the machine. The trucks are made with bottom doors, or with side or end tip, to suit the particular requirements of the works where they are employed.

At casting time the slag which may follow the iron at the end of the cast is run into cast-iron troughs, and when cooled is broken up by the slagger and thrown into the trucks; so that bogies and boxes are dispensed with in the general working of the blast furnace when these machines are employed. There is thus a considerable saving in labor, and in wear and tear of machinery and material employed in the disposal of slag from ordinary blast furnaces. Burst balls of slag, which might burn up the sleepers and roads and cause labor, are unknown. It is now no longer necessary to bar the balls off the trucks at the tip; and the constant repair, renewal, and shifting of rails and sleepers on the tip are now unnecessary. Two men per shift do the whole of the work required for the disposal of 6000 to 7000 tons of slag per week at the Newport Works, with one locomotive per shift, which is assisted on the day shift only for one-half of the time by a second locomotive, thus averaging 1½ locomotives per shift, in place of three locomotives when tipping on a mountain of slag. The enormous wear and tear of bogies and boxes due to the hot slag is now done away with; and the wear on locomotives is reduced to a minimum, the dust and dirt due to the old method being dispensed with.

The slag is run into the pans about 1 inch to 2 inches thick, and breaks up into pieces from the size of a nut to a few pounds weight. It is largely used for roadmaking, especially for the foundation of new roads. For concrete, being already small in size, it requires little further breaking to render it suitable; and for this purpose it has been found to be particularly adapted, some thousands of tons having been used for the walls of piers, wharves, &c., and also for the walls of buildings.

Experiments are now being made on a large scale with the view of using it extensively in the manufacture of cement, and it would appear likely to be largely used in future for the purpose. Not that it is a new idea to use slag for cement making; but the form and consistency into which it is run and manipulated in this apparatus adapt it in a special manner for cement manufacture. The slag is annealed or tempered in passing through the water, and that made from hematite iron, for instance, which contains a high percentage of lime, does not fall away into dust, as it otherwise does when run into balls and exposed for a short time to the atmosphere. In some districts vast quantities of ballast are brought for miles, and obtained in the first instance at some cost, for packing the sleepers of railways, which actually run past the very furnaces where this slag can so easily be made useful for the purpose. On the Northeastern Railway, which forms a network throughout the Cleveland and Durham districts, ashes from the iron works and coke ovens are universally used. This ballast retains a lot of rain and surface water and tends to rot the sleepers, and where steel sleepers are used nothing is more injurious and wasting. Were this slag used wholly or in part as ballast, a drier and more lasting road would be the result. On many railways the larger class of ballast is used entirely, and in some cases slag is the material chosen. There appears, therefore, to be a wide opening for the use of this material, which in most localities is at present a nuisance and a source of expense.

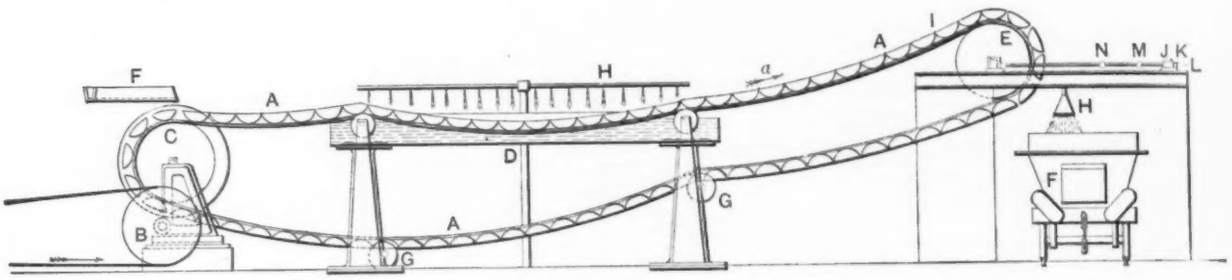


Fig. 1.—Elevation.

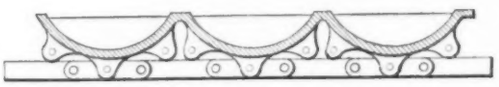


Fig. 2.—Section through Pans.

THE HAWDON ENDLESS CHAIN SLAG MACHINE.

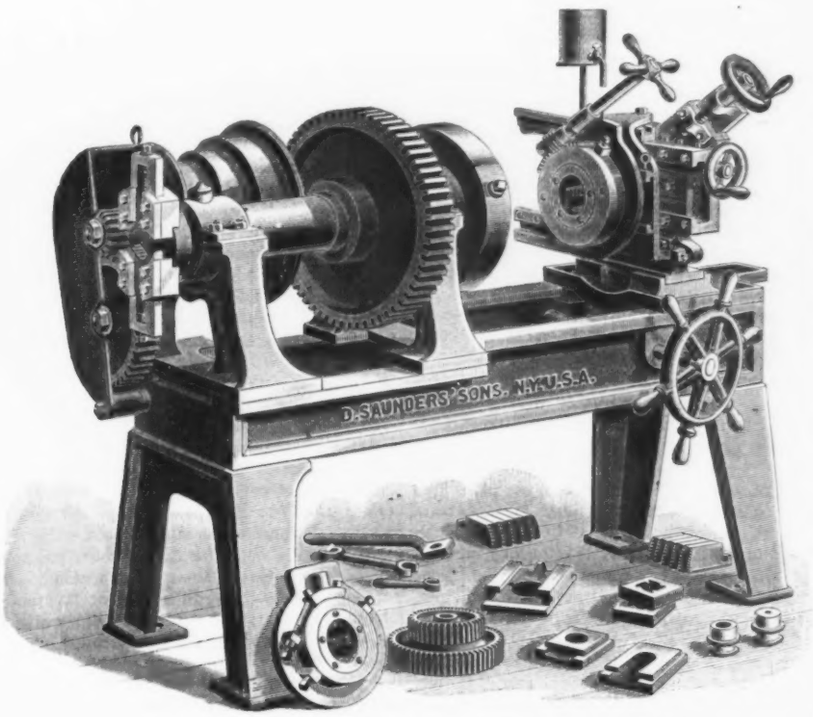
The apparatus now described is a simple contrivance, having probably no great merit as a mechanical device; but few things are more difficult to deal with than the force of expansion and contraction in metals, especially when brought about rapidly, and with continuous alternations. This is the case at blast furnaces in any mode of dealing with the slag, and particularly so when artificial cooling is resorted to, and though at last simplicity has now been arrived at, a good deal of time has been occupied and many devices tried before the desired result has been reached. Wear and tear, consequent on the rough usage which such apparatus is necessarily subjected to, require to be met by special consideration in the design of the different parts. Cheapness of manipulation being a matter of vital importance in iron manufacture, any apparatus or any method of treating the materials which realizes this object lays claim to the best attention not only of the makers of iron, but also of engineers generally, by whom this metal is so largely employed in all their works.

* From a paper read by William Hawdon of Middlesborough, England, before the Institute of Mechanical Engineers.

General Berdan is said to discredit the conclusions from armor tests, whether at home or abroad, and to think the armor is ahead of the guns.

The Saunders Pipe Threading and Cutting Machine.

The accompanying engraving represents a machine built by D. Saunders' Sons of Yonker, N. Y., for cutting off and threading steam and gas pipe. The belting and gearing have been arranged with a view of obtaining suitable power and speed for the various sizes of pipe, and the arrangement is claimed to be superior to most others in use. The die shown in place on the machine is adjustable and expanding, operated by cam slots to open and close the chasers. The die and head to which it is attached are so constructed that pipe may be alternately threaded and cut off without removing the die from the machine. The die being on the front of the cutting head can be brought close to the gripping chuck, and short pieces of pipe can be threaded. This advantage often saves the use of a nipple socket.



THE SAUNDERS PIPE THREADING AND CUTTING MACHINE.

When the pipe is to be moved in order to adjust it for cutting off to any length, the die and plate it is attached to are pushed to one side upon ways, allowing the pipe ample room to pass through the cutting head without passing through the die. It is said that this improvement is found in no other pipe-threading machine.

The cutting-off tool is convenient and is operated by the upper hand wheel. The hardened steel jaws are used for steadying the pipe while cutting it off. They are operated by a right and left hand screw, centering the pipe.

The jaws are adjustable to compensate for wear. The universal gripping chuck for holding the pipe is strong and well fitted. On the rear end of the spindle there is a self-centering two jawed chuck for steadying the pipe.

The machine is well designed and adapted to the work it is intended to perform.

William Young of Amsterdam, N. Y., has invented a new hammer action for chimes or bells. It is a decided departure from anything heretofore used in the line of bell clappers, and reduces the leverage considerably. It is said to lessen the weight of each bell over 50 pounds and diminishes also the great strain on the timbers and frame work of the belfry. It gives a clearer and quicker stroke, and by it, it is said, music which has never been attempted on chimes may be executed.

Warren Springer Indicted.

A Chicago Grand Jury last week brought in an indictment for involuntary manslaughter against Warren Springer, a wealthy proprietor of numerous structures used for manufacturing purposes. This action of the Grand Jury is, for the present, the culmination of a series of remarkable inquiries. After the fearful boiler explosion of January 8, 1892, by which four employees of Mr. Springer lost their lives, Coroner Hertz and Deputy Coroners Clement and Monoghan began the most searching Coroner's inquisition ever conducted in Cook County. More than 40 witnesses were examined and re-examined and a vast mass of expert and technological testimony was taken. After seven sittings the Coroner's jury held Springer and two employees to the Grand Jury for further inquiry and possible indictment.

For five days the Grand Jury heard testimony in the case, examining not only all the witnesses who had appeared before the Coroner, but many others. Nothing was omitted which could make that testimony complete and adequate, and every question was put with the purpose of eliciting everything the case contained.

The jury was in doubt whether to indict Mr. Springer alone or jointly with Edward B. Gallup, his superintendent. It was finally decided that Mr. Springer, as principal, was responsible for the actions and omissions of his agent, and the charges against Gallup were dropped. Mr. Springer thus finds himself in a very grave position, liable, in case he is found guilty of the crime charged, to imprisonment for a term of years.

WORLD'S FAIR NOTES.

Extent of Government Aid Wanted.

An omnibus bill has been prepared for the consideration of Congress, covering the entire amount desired by the several departments of the World's Fair. Under the provisions of the bill an appropriation of $5,000,000 is asked for the Illinois corporation and to be expended under orders from that body. This money is to be returned to the Government of the United States in the same proportion with an equal amount loaned by the city of Chicago. For the National Commission $1,160,000 is requested, this sum to be expended by the national body for awards, medals, juries and Board of Lady Managers, $125,000 being set apart for the use of the latter committee. Members of the Government Board of Control upon being consulted thought $600,000 would answer all their purposes in addition to $350,000 already appropriated. This additional amount is to be utilized in the payment for transportation and preparation of the Government exhibits in the building now in course of construction and territory adjacent. So that in all Congress is to be asked to appropriate close to $7,000,000 for the immediate needs of the exposition.

The latest estimates of the expenses of the fair show that upward of $20,000,000 will be required to make the exposition a success. Of this sum Chicago, through its Municipal Council and private subscriptions, has raised upward of $11,000,000, and expects to contribute from $2,000,000 to $3,000,000 additional. Many of those in attendance at the conference in Washington last Friday considered the estimates made in the proposed bill barely sufficient to meet the actual needs of the exposition, and the closest scrutiny of the expenditures was urged by any investigating committee which Congress might see fit to select for such a purpose.

The exposition management received last week the second $1,000,000 installment of the $3,000,000 resulting from the proceeds of the sale of the first $3,000,000 worth of city bonds. Treasurer Seeberger had just left for a trip to Florida, and was denied the pleasure of receipting for $1,000,000 in cash.

Intramural Transportation.

Two bids only have been received by the exposition management for the construction and operation of an elevated intramural railway in Jackson Park. This railway will be at least 5½ miles long, and is intended to carry passengers around the grounds during the World's Fair. The privilege of doing so has been regarded as offering a valuable franchise. Nearly two months ago Chief of Construction Burnham asked for bids for the privilege. Last Thursday he opened the iron box in which the bids had been placed, and found there were but two. Mr. Burnham was greatly surprised and unable to account for the apparent lack of interest in the subject.

One of the bidders was the Multiple Speed and Traction Railway Company of Chicago, more commonly known as the Movable Sidewalk Company. The other was the King Iron Bridge and Mfg. Company of Cleveland. Each bid was accompanied with a certified check for $25,000.

The Movable Sidewalk Company, represented by Max E. Schmidt, secretary and chief engineer, and J. L. Silsbee, second vice-president and general manager, propose to put in a plant costing $750,000 and operate it to the close of the fair. They propose to give the exposition management 37 per cent. of the gross receipts after deducting therefrom the cost of the plant and its operation. They promise to transport 40,000 passengers an hour past

a given point, and furnish each person a seat, charging 5 cents a ride, the passenger to remain on the cars or sidewalk as long as he might see fit.

This movable sidewalk is something of a novelty, but a trial track has been in operation at the north end of Jackson Park since last November. It has been described a number of times, but the chief features are that there are two moving platforms running side by side on the same level, one traveling at the rate of 3 miles an hour and the other at the rate of 6 miles an hour. Passengers step on the first platform, which will be provided with hand posts and rails, and then on to the second platform, where seats capable of holding three persons are to be provided. The second platform will have a continuous covering, shielding passengers from sunshine and rain. The entire system of cars is a continuous one, and there will be no stopping or starting unless the exposition company should desire that at certain intervals the platform should stop.

The road is to be an elevated one, moved by electricity, and the company agree to put in an ornate steel substructure on single posts. Platforms and stairways will be erected every 400 feet. An advantage claimed for the system is that passengers may get on anywhere, get off anywhere, ride as long as they please, and be entirely free from the danger of collisions. The trial road has been in operation at Jackson Park over three months, and no one, it is said, has been injured. As an extra precaution a system of electrical exchange will be provided and push-buttons placed on the stationary platform at short intervals. These will be connected with an electric bell and automatic circuit-breaker in the controlling station, by means of which the train can be instantly stopped by an attendant pressing the button.

A feature of interest in connection with the bid is a calculation showing that if the road carries 100,000 passengers a day during the six months of the fair the profit accruing to the Exposition Company will reach nearly $600,000. Owing to the peculiar character of construction of the line the company offer to depress the tracks and run the platforms entirely beneath the surface of the ground if desired in certain localities.

The King Iron Bridge Mfg. Company propose to run a novel system of electric cars known as the unicycle system. The company offered to put on 30 motor cars and 30 trailers, making 30 trains of two cars, each car to accommodate 40 passengers. The company thought they could make a round trip of 5 miles, including 24 stops, in 30 minutes. It is proposed to charge passengers 5 cents each way. They were willing to give the Exposition Company 1 cent for each passenger. In a day of 14 hours, from 8 a.m. to 10 p.m., the company figured that their 30 trains could carry 134,400 passengers. This would be at the rate of 9600 passengers an hour.

The Movable Sidewalk Company, for a day of 14 hours, guaranteed to accommodate 560,000 passengers if the capacity of the system were reached by the crowd. The company thought, however, that their full accommodations would not be availed of, and that probably not more than 100,000 people a day would patronize the intramural railway.

Before final action is taken the matter will be referred to the Committee on Ways and Means, which must agree upon the percentage to be paid the Exposition Company for the privilege of operating a road.

News from Russia.

Director General Davis has received from the Department of State at Washington an official report from the Hon. Charles Emory Smith, United States Minister to Russia, to Secretary Blaine, in reference to the exhibit at the World's Fair to be made by the Russian Government. It is dated St. Petersburg, February 9, and is in substance as follows:

"An interview held yesterday with Privy Councillor de Bachr, Director of the Department of Commerce and Manufactures in the Ministry of Finance, who is president of the commission charged with the duty of organizing the Russian section of the World's Columbian Exposition, developed statements of great interest and importance, bearing upon Russia's participation in that undertaking.

"Mr. de Bachr and his colleague, Mr. Timiriasoff, stated that the Russian Government had decided to assume direct charge of and full responsibility for the Russian section of the exposition. It would undertake to transport all of the Russian exhibits at its own expense from St. Petersburg to Chicago, and at the close of the exposition to return such of them as are not otherwise disposed of from Chicago to St. Petersburg. The sole care and cost for the individual exhibitor would be to place in St. Petersburg the objects assigned to be exhibited. From this point the Government would assume all the rest. Indeed, the Russian commissioners indicated that in many cases it would do more. In the case of proposed exhibits from the remote parts of the empire, as from Central Asia, it would also take upon itself the cost of transportating them to St. Petersburg.

"The Government goes still further in its active interest; it not only pays the expense of transportation from St. Petersburg to Chicago and return, but its commission addresses itself directly to the various industrial arts with the view of assuring a comprehensive and representative exhibit. It not only issues a general invitation with the statement of its most liberal proposition, but it makes special application in the name of the Government where particular exhibits are desirable. Thus it was stated that the Governor General of one of the Central Asian provinces had been directed to arrange and forward to St. Petersburg a collection of the unique and beautiful textile productions of that section. Steps have also been taken to secure specimens of mosaics, precious stones, enameled ware, porcelain from the Imperial fabriques, and of all the fine arts, as well as of the various industries. In a word, the Government commission undertakes to organize an exhibit which shall fitly illustrate Russian skill and achievement in the several fields of their application, and the assurance of the commissioners furnish warrant for believing that the display will be as interesting as the spirit of the Government in preparing it is broad and liberal."

Austria and the Fair.

The extremely favorable attitude of the Austrian Government toward the World's Fair arouses significant comment in London. The fact that the Austrian Government has appointed as its commissioners to the exposition men of the very highest political and social position in the empire is taken to prove the earnest intention of the Government to make the representation of Austria at Chicago something exceptionally marked. The London *Standard*, in referring to the participation of Austria in the World's Fair, alludes to the publication in the Austrian *Gazette* of the nomination of Archduke Louis, the imperial heir apparent, as patron of the Austrian section of the Chicago Exposition. The Marquis Bacquehem, Austrian Minister of Commerce, is appointed the president of the Austrian commission, which comprises five vice-presidents and 75 others as members of the Central Committee, and, finally, 15 members of the Executive Committee, all prominent men and identified with the most important and, indeed, leading industrial interests of the empire.

The *Standard* says: "This is the strongest official body on record in this country connected with an international exposition, showing that Austria intends to be largely represented at Chicago." This from a leading metropolitan daily in the city of London, where the international exhibition as a potent force in the world of industry and art was developed, is most significant, indeed, construed in its bearings toward the interests of the Columbian Exposition at Chicago.

Australia.

Col. Alex. Campbell of Wheeling, W. Va., World's Fair Commissioner to Australia, reached home on the 2d inst., after an absence of eight months, during which time he has gone around the world, spent time enough in Australia to arouse the inhabitants thereof to the importance of the World's Fair, and had at least one cherished opinion changed.

"I went away," said Colonel Campbell, "believing in the free and unlimited coinage of silver. I come back with that notion knocked out of me. While I was in Ceylon the silver rupee depreciated as much as 2 per cent. in a single day, and I began to realize what might happen in our country. I talked with a banker in India, got his experience, and saw it all clearly enough. It won't do for us. This country would become the dumping ground for the world's silver.

"Australia and the World's Fair? Well, Australia has asked for 1,000,000 feet of space. I don't know whether it can get that much, but that is what it wants. As soon as they understood the nature and scope of the exposition they took hold, and I want to say to you that they will surprise the world with their products. To show the interest there is in the fair an Australian steamship company will run three fine steamers to San Francisco during the fair. The show by the way, is going to change largely the course of travel between England's Australian and Indian dependencies and the old country. For a great part of the year the passage through the Suez Canal is almost intolerable. I came through at a most favorable time, yet I had to remain on deck until 3 o'clock in the morning on account of the intense heat. To land in San Francisco, cross the continent rapidly and comfortable, and take a steamer at New York, will be an agreeable change, and travelers will seek it."

Iron and Steel Work.

The following table shows that thus far less than one-third of the iron and steel work required in the fair buildings has been put in place, although so much has already been accomplished in construction:

	Total placed. Pounds.	Total required. Pounds.
Woman's	173,900	173,900
Mines	1,700,000	1,700,000
Horticulture	2,500,000	2,500,000
Fisheries	556,000	636,000
Administration	1,220,000	1,562,607
Machinery	90,000	11,000,000
Fine Arts	430,500	1,400,000
Electricity	1,136,965	1,500,000
Transportation	1,010,000	1,050,000
Agriculture	826,500	2,000,000
Manufactures		12,000,000
Government	424,000	1,840,000
Illinois State	187,000	1,340,000
Total	10,254,865	38,702,507

Machinery Requirements.

Chief Robinson of the machinery department is receiving from the brick, tile and terra cotta manufacturers of the United States applications for so much space for exhibiting their brick, tile and terra cotta manufactures that he has concluded to ask

the Chief of Construction if it is possible to obtain space for a special building therefor. It is, of course, understood that, as in the case of the leather exhibit, the manufacturers prominently identified with this interest will be called upon to raise the sum of money necessary to erect such separate building. These manufacturers desire to show the process of the making of tile, brick and terra cotta, but no decision has yet been arrived at.

Chief Robinson is also asked for an additional building, approximately 50 x 100 feet, for a special exhibition of heavy machinery, such as drop hammers, steam hammers, forges, and such other exhibits requiring the use of fire.

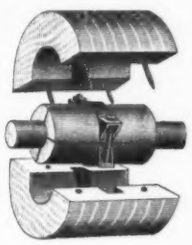


Fig. 1.

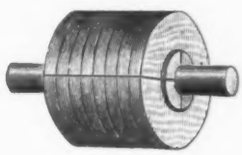


Fig. 2.

THE REEVES WOOD SPLIT PULLEY.

Want State Boards to Hustle.

World's Fair State boards will have to hurry along building plans for their pavilions at the Fair. Director-General Davis and Chief of Construction Burnham held a conference last week and decided that plans for State and foreign buildings should be submitted and approved by May 1. While this date was not finally fixed upon, it is the opinion of the two officials that not much greater latitude should be given for the presentation and acceptance of plans.

Illinois is the only State thus far which has begun work on its building. The remaining States and Territories of the Union have done nothing. Less than a dozen have had plans approved by the Construction Department. The others are still without building plans.

"It is time to stir these people up," said Director General Davis. "I think we have waited long enough to know what the States intend to do. Sites for their buildings were apportioned months ago, and there is no occasion for interminable delay. We want all the structures completed on time, and, besides, if the space assigned to the States and foreign nations is not going to be utilized it will be allotted for other purposes. We are crowded now with applications for room, and there is little reason for permitting an unnecessary dilly-dallying and final abandonment of space which is so much needed."

Strikers Return to Work.

All the striking staffmakers at Jackson Park went to work again last week. There were at least 700 of them. The men employed by Smith, Crimp & Eastman received an advance of two and one-half cents per hour. They agreed not to strike for higher wages while in the employ of the firm. The same rate formerly paid obtains in the shops of the other contractors, where wages have been approximately what the strikers demanded of Smith, Crimp & Eastman. The Northwestern Contracting Company, who have the exterior covering on the Government Building, have had some trouble also with their men. The management now promise to pay them the same proportion of wages paid by the other contractors for what they have done and what they will do in the future. There is no other labor trouble, despite reports to the contrary.

What Has Been Accomplished.

Seven of the eleven big buildings have their structural work practically completed. These are the Woman's, Transportation, Horticultural, Administration, Mines, Forestry and Fisheries Buildings. In accomplishing this work the monthly report of progress shows that on an average 4400 men have been employed during February, and that the maximum number of men reached 4800 in the middle of the month. As the buildings have advanced fewer men have been needed; but more work was performed in February than in any preceding month. On the seven buildings indicated the finishing work of painting, glazing, lathing and exterior covering is in progress.

Items.

Every day during the last two weeks the mailing department of the Columbian Exposition has sent out a wagon load of information for exhibitors. The pamphlets prepared by department chiefs for the information of exhibitors, recently received from the printer, have been dispatched in large quantities. Twenty thousand were sent to foreign countries for Chief Fearn and as many for Chief Allison, of the Manufactures department. In all, nearly 1,000,000 pieces of mail matter have left the offices, and telegraphic requests for more documents are received nearly every day. Chief Allison received 250 replies from intending exhibitors in one mail.

"We are not having any trouble in getting applications for space," said Director-General Davis as he surveyed a stack of letters. "The trouble is in finding room for the exhibits promised."

The Committee on Grounds and Buildings are considering offers in reference to supplying the gas needed on the exposition grounds. The Mutual Gas Company have offered to furnish it for 50 cents per 1000 cubic feet. The Chicago Gas Company want 90 cents per 1000 cublic feet for the same service.

Director-General Davis has alloted for a Canadian display 68,471 square feet of space. This does not include room in the Agricultural Building, for which no provision has as yet been made. The space set apart in the several buildings is as follows: Forestry, 4000 square feet; Horticulture, 8000; Mines and Mining, 1000; Machinery, 11,471; Transportation, 15,000; Manufactures, 15,000; Liberal Arts, 5000.

The wood-working machinery manufacturers of Cincinnati are all making assiduous preparations for an exhibit. J. A. Fay & Co., the Cordesman Machine Company, the Egan Company, have all applied for large spaces and there is no doubt but what they will have a display worthy of the greatest wood-working machinery center of the world.

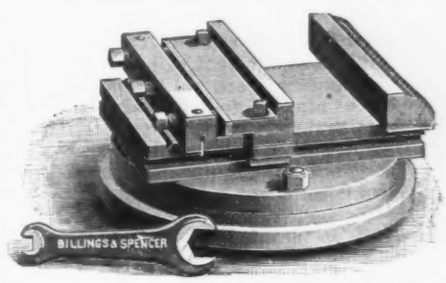
The Reeves Wood Split Pulley.

For some time there has been needed a small wood split pulley from 6 to 10 inches in diameter so built as to receive the same bushing and to possess within itself the same proportionate clamping powers and to be as readily put in position as larger pulleys. These merits are claimed for the pulley here shown, which is made by the Reeves Pulley Company of Columbus, Ind.

Fig. 1 represents the different parts which enter into the construction of the pulley. The malleable clamping bands are applied to the exterior of the bushing as shown, and securely clamp it to the shaft by means of the bolts. It will be noticed that the two halves of the pulley are not as yet in place and, therefore, nothing prevents the free action of the wrench upon the nuts. Fig. 2 represents the halves of the pulley adjusted over the bushing and clamp and held in place by large wood screws. The lugs thrown out upon the clamp completely prevent the pulley slipping on the bushing, and render it able to withstand any strain placed upon it. The value of this invention is understood when we consider that it takes just as much time and is as expensive and annoying to take down a large section of line shaft for a 6-inch pulley as it would be for a 60 inch, besides, owing to the exactness with which small pulleys should be figured in order to get the required speed, mistakes more frequently occur than in larger sizes and consequently changes are more often necessary.

The Jordan Planer Chuck.

A new 6 by 8 inch round base planer chuck is being brought out by the Worcester Chuck Company, G. W. Jordan, agent, Worcester, Mass. It will be observed that there are no slots in the top of the bed to fill with chips, the jaw being held down by steel gibs on each side. Riveted to the front jaw is a strip of tool steel for the set screws to bear against.



The Jordan Planer Chuck.

The holding strip and set screws are tool steel. The base is graduated to facilitate adjustment.

An Ice Machine Patent Suit.—The celebrated case of the De La Vergne Refrigerator Company of New York *vs.* John Featherstone's Sons of Chicago, involving the validity of the James Boyle patent in the manufacture of ice machines, was last week decided in the Circuit Court of the United States, at Chicago, by Judge Blodgett in favor of the Featherstones. The court's decision wipes out the patent. This case involves several hundred thousand dollars, and is a serious blow to the De La Vergne Company.

The Featherstone machine was manufactured under a patent owned originally by the Consolidated Ice Machine Company

of Chicago, and which was purchased when the latter concern failed. The infringement was claimed by the De La Vergne Company on the manner of compressing the ammonia, and suit was not only brought against the Featherstones, but all the brewers, packers and cold storage firms using their machine were notified that they would be prosecuted if they continued to do so.

The Somerton Tin-Plate Works.

Somers Brothers, the leading manufacturers of decorated tinware in this country, decided upward of a year since to build a tin-plate plant to cover their own requirements, and to market the surplus. One of the principal reasons which induced them to take this step was their inability to have their needs given the close attention which they desired, the Welsh makers being unable or unwilling to perfect their product in certain particulars, notably in the matter of uniformity of gauge. The first intention was to build a three-mill plant, but consequent study of the details, by D. M. Somers, one of the firm, showed the possibility of considerably enlarging the plant. The problems involved in the design of the works were complex and have been solved with a great deal of ingenuity. Only a relatively small tract of land adjoining the factory of Somers Brothers, Third street and Third avenue, Brooklyn, was available, and the character of the ground was such that deep foundations were necessary. On the other hand, however, a branch of the Gowanus Canal passes to the back of the tract, so that excellent facilities for the receipt of raw materials are at hand. Practically the plant consists of a two-story mill, the lower story being on a level with the canal, while the upper story is on the level of the street. The main mill consists of six sheet mills and a train of three sets of cold rolls, the latter placed one back of the other so that the cold rolling can be made continuous and automatic. The six sheet mills are arranged in three groups, driven by gearing from the main shaft, which is carried on heavy masonry piers. On the same shaft are eccentrics which drive the squaring and doubling shears, in close proximity to which is a shute leading to the lower floor, through which the shear scrap is delivered, where it will be bundled by hydraulic pressure. Each mill is served by a heating furnace, of special design, to reduce oxidation to a minimum, the fuel used being crude oil. We may note in this connection that oil is exclusively employed in this mill, provision being made to pump the oil from iron tank boats on the canal. The whole line of the heating furnaces is commanded by an overhead track, by which the steel is distributed to the different mills. This steel is unloaded from boats on the canal, and is lifted by elevator to the level of the track mentioned. The line of roll is commanded by an overhead trolley, so that the rolls can be readily conveyed to a special grinding machine to turn the rolls whenever necessary. Special attention will be paid to keeping the rolls true and it is estimated that five out of the six mills will be kept in continuous operation. In the corner of the building, accessible to the canal, will be a pickling machine of special design, while back of the train of rolls a large annealing furnace is being erected. Special machinery will also be put in for opening the packs. The cold rolling plant will be supplemented by an automatic sorting machine to reject all sheets which are not within the range of specifications as to gauge.

In the middle of the mill is the tandem compound Corliss engine resting on its foundations on the lower floor. It is to be inclosed in a handsome structure of glass and iron, the upper floor of which will be utilized as the office of the superintendent, who will be able at a glance to watch every part of the mill. Near the engine is the hot well, while three vertical boilers of the Corliss type are in close proximity. These boilers are fired with oil, being equipped with a special combustion chamber designed by Mr. Somers. On the other side of the engine is what may be termed the tinning department. The center of the floor space is occupied by a large annealing furnace, under which the hot well, already alluded to, is located. Along the wall is placed first a pickling machine, and then a series of six tinning stacks, which will be heated with waste heat from the heating furnaces. Two Edwards machines are now in place, and four other machines of special design are to occupy a place in this department. The tinning machines are separated from the main building by a brick wall pierced with arches. They are flanked by storage tanks for the plates and will be supported by cleaning machines, which, like other special machinery, are being built in the private machine shops of the firm. Particular pains have been taken with the ventilation. A fan made of deoxidized metal will be run at such a speed that it will displace the air in the tinning department every three minutes, and similar appliances are arranged for the pickling machines.

The plate, after being cleaned, is delivered to the packing room, which occupies the lowest floor of a large building with handsome front. This building has now four stories, to which two will be added later on. Special facilities will be provided for shearing and squaring the plates.

The buildings are of brick, the floor of the mill resting on heavy steel beams and brick arches. The roof truss is of iron, and the roof proper is sheathed with wood. In the effort to make a model mill no pains have been spared, the aggregate investment approaching $250,000. The guiding idea throughout has been to attain two ends, the highest quality of product and the introduction of labor-saving appliances. Those who have designed the plant are looking beyond the time when their competitors will be the Welsh makers. They are preparing even at this early stage for the struggle which must come among American producers of tin plate, when American ingenuity and the spirit of American progress shall dominate the industry. The desire to obtain the best appliances and build in the most substantial manner has delayed the completion of the plant. It is probable, however, that it will be running early in May.

The Challenge Emery-Wheel Dresser.

The general arrangement of the Challenge emery-wheel dresser is shown in Fig. 1; the method of mounting the cutter is shown in Fig. 2, and the oblique grooves made in the face of the wheel are shown in Fig. 3. It is claimed that this method of dressing with oblique grooves increases the cutting qualities fully 25 per cent, prevents glazing, neutralizes hard spots and makes the wheel wear to and keep an even straight face. The cutters revolve, practically, on ball bearings, thus greatly reducing the friction and permitting a fixed shaft (by set screw); consequently there is no wear on the journals and the handle remains good indefinitely. This dresser is made by the Appleton Mfg. Company of Philadelphia, Pa.

Fig. 1.

Fig. 2.

Fig. 3.

THE CHALLENGE EMERY—WHEEL DRESSER.

The Edison Electric Company have been making experiments at Watertown, N. Y., to secure an automatic regulator to govern the speed of the dynamo. The company's electrical expert, Robert S. Ashe, and Edward Barber of Watertown, have at last, after many set backs, solved the problem. The dynamo has heretofore been regulated to a speed between 600 and 700 revolutions per minute by three switches connecting the dynamo with large resistance coils. These coils take the current when the dynamo produces a superfluity and convert the electricity into heat. The switches have been operated by hand, the resistance being switched in when the dynamo was running too fast and disconnected when all the power was needed. A new apparatus has been put in by Messrs. Ashe and Barber, which, though yet crude, effectually solves the problem and acts perfectly. The switch is an ordinary one used for electricity. By the new automatic arrangement the switch is operated by the current from the dynamo. A wire connects the dynamo with electromagnets, which are gauged in connection with a relay so as to energize or de-energize a solenoid, or hollow electro-magnet. This contains a plunger, a round steel bar 8 inches long and about 3 pounds in weight, which rises as the solenoid is energized, switching in the resistance, and falls as the solenoid is de-energized, throwing out the switch and cutting off the resistance. The electro-magnets are so sensitive, and the solenoid so responsive, that the resistance is oftentimes

switched in and out twenty times a minute, the dynamo being kept within a speed of 660 and 700 revolutions. The appliance is remarkable, though simple, and the Edison Company have worked on it over a year.

The Manufacture of Horseshoes.

C. H. PERKINS' METHODS AT PROVIDENCE, R. I.

Starting in a modest way in the year 1867, the Rhode Island Perkins Horseshoe Company of Providence, R. I., have, through the efforts of C. H. Perkins and R W. Comstock, developed into one of the largest plants in the country. How ample financial success has accomplished this development was clearly shown in the report of the auditor who examined the books in 1891.

The methods of manufacture are unique in many respects, the more recent departures from common practice lying in the direction of the preliminary preparation of the stock in the rolling mill. The latter is of general interest in reflecting advanced practice in a line of work which is securing recognition in a number of industries allied to rolling mill work. The more recent methods invented and put into successful operation for the further advances in the preparation of the stock in the rolling mill have largely increased the heretofore successful operations of the manufacture at the Rhode Island plant.

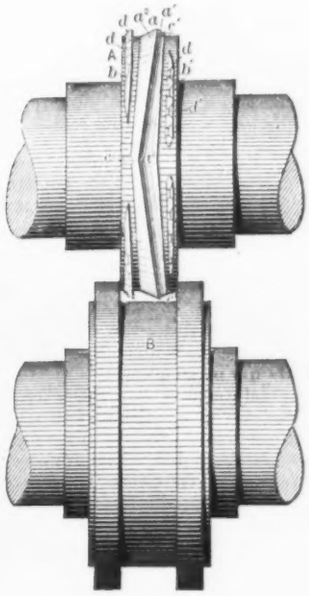


Fig. 1.—Die Roll.

Fig. 4.—Bent Horseshoe Blank.

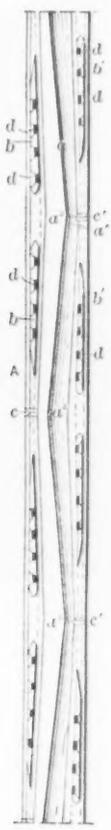


Fig. 2.—Horseshoe Blank Bar.

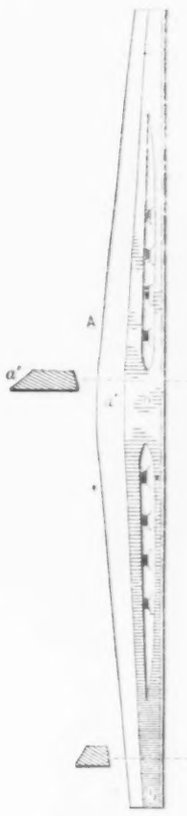


Fig. 3.—Blank.

Rolling Horseshoe Blanks.

The accompanying engravings may serve to illustrate the general features of the more recent Perkins inventions, which allow of the production at low cost of a variety of special forms of shoes, weighted so as to best serve the requirements of every individual case. Mr. Perkins rolls his blanks from straight-edged bars by means of a die roll, which constitutes the last pass in the mill. The die roll has a zigzag grooving tongue, A, Fig. 1, which inclines to and fro with respect to the edges of the working face of the roll. It is broadly beveled at a^2, located so as to produce a broad bevel on the blank at the inner side of the heel ends. This grooving tongue also performs the important function of so dividing the blanks of one series in a bar from those of the other that a slitting machine can readily separate them. The die roll has also two series of nail scores b, b', so arranged in pairs that the pairs in one series alternate with those of the other series. Finally there are the heel marking studs, c, Fig. 1, which produce the cuts c and c', Fig. 2. The product of rolling in the die roll is the double blank bar, Fig. 2, which consists of a series of alternating blanks from the points c' c'. It will be evident that all that is needed is to slit the blank bar along the zigzag line, cut up the single series of blanks thus produced at the heel marking points c' c', and bend the single blanks into the horse shoe form. Fig. 3 shows a single blank bar as sheared, and Fig. 4 a horseshoe bar bent to the correct form.

The Mill.

The raw material is largely old iron and scrap, the latter including boiler plate, &c. A part of the supply consists of small scrap. The works use also for the manufacture of their steel shoes, steel billets, the usual size being 2 inches square. Scrap and fuel are delivered on sidings alongside the mill, and the track facilities for loading product are very adequate. The rolling mill is a commodious, well lighted structure, 404 feet long by 100 feet wide, with heavily trussed iron roof. It contains in all three muck trains and six finishing trains.

The stock is sheared and piled, there being three shears. Three scrap furnaces fired with Cumberland coal, as are all the heating furnaces, are used for heating the piles, which are rolled on the first 18-inch two-high muck train, the bar being cut into proper lengths by a shear driven by a special engine. This train is driven direct by a horizontal engine, 22-inch diameter of cylinder, 48-inch stroke and 20-ton fly wheel. It has three stands, one three-high, in which five passes are made, one intermediate two-high for one pass and a two-high finishing stand containing the die roll. The first train is used for rolling the shapes for the common flat horse shoes. It is equipped with shears to cut the blanks to length.

The second finishing train is used for rolling double iron—that is to say, bars in which the blanks for shoes are rolled in twos, side by side. In this group are the Goodenough, the toe weight, the side weight and the snow shoes. The train is backed by a machine for slitting the toe weight shoe blanks.

The third finishing train is driven by the same engine which handles the second. It has 22 inch diameter cylinders, 48-inch stroke and 20 ton fly wheel. The third train is employed generally on ordinary flats. In an annex is located the roll turning machinery.

The fourth finishing train is usually employed in rolling double iron for the Goodenough, toe weight, side weight and snow shoes. It is driven by an engine to which, besides, the second muck train is coupled.

The fifth finishing train is a faster one than the others, running at 265 revolutions, while the others make about 225 revolutions. It is driven by a 12 x 12 Armington & Sims engine and is employed in rolling toe calk shapes, the smaller shoes, and steel shoes, where greater speed is necessary. It has four stands of rolls. Adjoining this train is the toe calk shearing department. This department of the business is one which the company have recently taken up with much success. A special engine drives the toe calk shearing machinery, and furnishes power also to the adjoining hammer shop.

The sixth finishing train and a third muck train are similar in design to the other groups of like character. A tubular boiler is located in this part of the mill, which is intended to act as a reserve when other parts of the mill are idle. Every train is equipped with a coal fired heating surface, the waste heat being utilized to raise steam in the overhead boiler.

Parallel with the mill are two hammer shops, the larger one of which was destroyed by fire in 1887, the smaller one escaping These shops contain 26 complete machines, each consisting of a hammer and a bending machine. The blanks are heated in small coal-fired furnaces, one for

each set, the waste heat of four furnaces being utilized to raise steam in a boiler located between them. The heated blank is bent to the horseshoe form in the bending machine and is then transferred to the hammer. The latter consists of five or six rolls, 4 inches in diameter, mounted on a revolving shaft. They strike a drawing blow upon the shoe blank. Its effect is to make the metal draw toward the heel, making the shoe stiffer in the quarter, hemming it in at the same time.

The Goodenough shoes, since they have the calks in them ready for putting on cold, cannot be worked in this way. They are bent into shape in the usual bending machines and are then pressed in presses, of which there are now eight in the plant, with two more building. The upper die being perfectly level, the shoe is given an even foot surface. It can then be put on cold, and the heel need only be opened or closed to make it fit the hoof.

The adjoining punching room contains 44 machines. For the removal of the burr left after the punching there are very ingenious simple machines designed by Mr. Perkins. Of these burring or grubbing machines there are six, two clippers for Goodenough shoes and six grubbers for hind shoes. The machinery is driven by a 14 x 42 engine. In the hammer shop there are four trimmers for all double blank bars and three slitters.

All the principal repairs at the mill and all the machinery is made in a well-equipped machine shop, which is a part of the plant, as is also a foundry for making machinery castings. A very large packing room is connected with a system of rigorous inspection. We may add that the plant never runs double, because the quality of the product may suffer from night work. A keg making plant completes the outfit. The works have excellent facilities for the receipt of raw material and the shipment of goods, and the handling of stock in the mill proper is well arranged. The company employ about 425 men, among them a large proportion who have been engaged in the work for many years. The product is 260,000 kegs of horseshoes per annum and 300 tons of toe calks. Additions nearly completed will increase the annual production to 300,000 kegs per annum. Aside from the ordinary line of goods the concern makes the following specialties: X L steel shoes, 0 and 00 mule shoes, jack shoes, cowboy shoes, front toe weight shoes, hind steel side weight shoes and Goodenough shoes.

One important element of the success of the concern has been the practical knowledge possessed by the managers of the wants of the blacksmiths as to the shape and style of horse shoes. Another is the fact that all parts of the business are carried on by the company, who make their own iron, castings, machinery, kegs and packages for calks, thus deriving the benefit of the profits arising from these various branches.

The Aluminum Alloy Metal Company of Hampton, Iowa, are meeting with much success in introducing their metal to popular favor. They have been so encouraged that they are making great advance in the manufacture of special grades suitable to a variety of purposes. Roofing contracts are being made in increasing number. The La Rue Hardware Company, their agent at Kansas City, Mo., recently secured a very large roofing contract for a grain elevator. Its durability is being more thoroughly established as time passes, and the metal exposed to all weathers is seen not to rust, although completely unpainted. As has before been noted, the metal contains neither iron nor steel. The roofing metal has but a small percentage of aluminum in it, in order to give tinners as little trouble as possible in soldering, but the sheet metal made for stamping and spinning contains more. Quite a number of agencies have been established for the sale of the company's products and all report constantly increasing business.

A Great Electric Mining Plant.

The utilization of sources of power remote from its point of application has, during the past two years, received considerable attention from electricians in this and other countries, and repeated experiments have demonstrated the practicability of utilizing power by the adoption of electrical methods which would otherwise be wasted, and of its utilization to such advantage that projects may be and have been carried out, which without the application of electricity would have been impossible. This has been particularly the case in the mining industry. Lodes of metal are frequently found at great altitudes, where, unless some cheap power can be supplied at the required spot, they can never repay working. It is not so long ago that a project to generate power for mining purposes at the foot of a mountain and utilize it economically either midway or at the summit would have been scoffed at as visionary, but this feat has been accomplished and with complete success.

Probably the best example of this at the present time is the large plant which has been installed by the Edison General Electric Company at the Virginius group of mines near Ouray, Colorado. It is one of the largest, if not the largest purely mining plant in the world. Every difficulty likely to be met with in work of this nature was encountered in the installation. The pipe line is laid along the side of a rocky cañon; the wires from the power house to the mine are strung partly through dense timber where they are exposed to damage from falling trees, and partly above timber line over rocks and snow banks where the poles and wires are liable to be carried away by snow slides, and where lightning storms are frequent and violent. The line is nearly 4 miles long, the voltage of the current 800 volts and the mine is wet. The relative advantages of the ground return and complete metallic circuit are illustrated, and switches are so arranged that either may be employed, the metallic circuit being used at present. The plant includes a variety of machinery, comprising two pumps, one hoist, one blower and two motors running mills; indeed, almost everything except locomotives and drills, and these will probably be added shortly. Lastly, the enormous saving that can be effected in many places by the utilization and transmission of water power by means of electricity is strikingly manifested. Coal at the mines costs $18 per ton, and before the installation of this plant was made the cost of the power amounted to nearly $40,000 per annum. This sum is saved by the adoption of electric power. An instance is also afforded of unprofitable mines being rendered profitable by the use of cheaper power, for while some of the mines in this group are rich enough in metal to repay working under the most adverse conditions, there are others of lower grade which would have been shut down in case the electric plant had proved a failure, but which, with the plant, will now yield a satisfactory profit.

The foregoing gives a general idea of the nature of the plant and the difficulties encountered in its installation, but an actual visit to the mine is necessary to give a correct conception of the real character of the plant. Great credit is reflected on the managers of the mine, who possessed the requisite enterprise and sagacity to expend a large amount of money on a purely speculative experiment, the success of which was regarded as uncertain by even the strongest advocates of electric transmission of power.

The Virginius and neighboring mines, owned by the Caroline Mining Company, are situated near the summit of Mt. Sneffles, in the region of perpetual snow, at an altitude of 12,700 feet above the sea and about 5000 feet higher than timber line. They are reached by a wagon road open in summer, but impassable in the winter, when the only route to the mines is by a difficult trail, the lower part of which, denominated the "zigzag," winds up a declivity so precipitous that burros with the packs, slipping from the trail, frequently roll down past several branches of the zigzag before they are stopped by a tree or rock. The upper part extends over a rocky plateau above timber line, and along cliffs where the snow is frequently over 20 feet deep on the level, and where terrific wind and lightning storms are frequent. The lower half of the line from the power house to the foot of the zigzag extends up a deep cañon through a forest of dense timber. The danger of breakage and grounds from falling trees, which are frequently blown down by storms and rest on the wires for some time before they can be removed, is continually present. The construction of heavy line work over nearly 4 miles of such ground is an undertaking the difficulty of which is evident, but which can be fully appreciated only by an actual examination; while the maintenance and operation of the plant under the conditions just specified present even more serious difficulties. But although these difficulties are exceptionally great, the enormous expense of transporting fuel to the mines rendered the advantages of an electric transmission plant so very striking that the management was induced to make the trial.

The water power utilized for the plant in Red Cañon Creek, nearly 4 miles from the mines. The water power plant consists of a small dam, an iron pipe line extending along the side of the canon a distance of about 4000 feet, giving an effective head of 485 feet, and two Pelton wheels, one 5 feet the other 6 feet in diameter, capable of developing under that head 500 horse-power and 720 horse-power respectively, or a total of 1220 horse-power, the two wheels being connected to separate shafts, so that either wheel may run the entire station. The electric generating plant comprises at present one 100 K. W. Edison dynamo and two 60 K W. Edison dynamos, giving a total output of 293 E. horse-power. The length of the line, as previously described, is a little over 19,000 feet. The electric machinery operated at the mines consists at present of two pumps, 60 horse-power and 25 horse-power respectively, one 25 horse-power hoist, two Edison motors, each of 60 horse power, running concentrators and stamp mills, and a 15 horse power blower. The large pump which was erected when the plant was first installed raises 150 gallons of water 700 feet per minute and is of the Knowles duplex type. An Edison standard motor is geared to it by a double worm, one right hand and one left hand, working into two spur gears that mesh into each other and operate the pump, the object of the two worms being to neutralize the longitudinal thrust. The smaller pump, which was installed a few months ago, is somewhat similar, the motor, however, being mounted over the pump with its armature vertical, the weight of the armature counteracting the thrust of the single worm employed. Both pumps have been working steadily and smoothly for several months and have satisfactorily filled requirements.

The hoist consists of an Edison motor of standard type, but of street car winding

and controlling switch, geared to the drum through the medium of a friction clutch. By means of the controlling switch and clutch the hoist is under more perfect control than a steam hoist. The motors for the mills and blowers are of the standard type, and present no exceptional features.

The most serious troubles have been caused by lightning—electric storms in that section of the country being frequent and very violent. This has formed the subject matter of particular study, and special lightning arresters have been devised that give excellent protection. Since their adoption little or no trouble has been experienced from this source.

That difficulties were encountered in the early operation of the plant is not surprising, and the fact that these difficulties have been overcome and the entire plant operated successfully and satisfactorily under conditions that for severity are not likely to be exceeded anywhere demonstrates the practicability of electric power for mining and guarantees its success in this field.

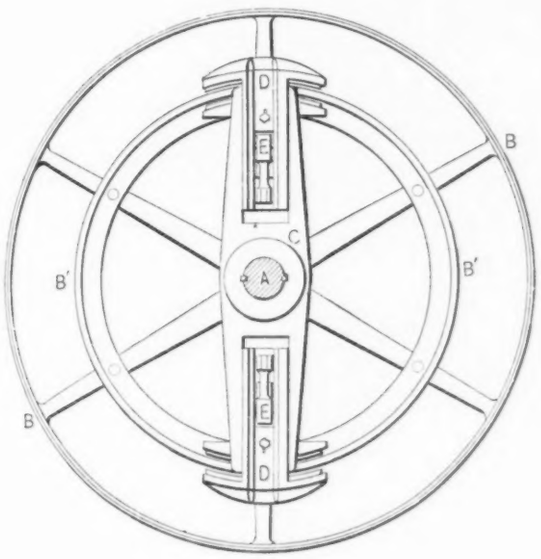


Fig. 1.—Cross Sectional Elevation.

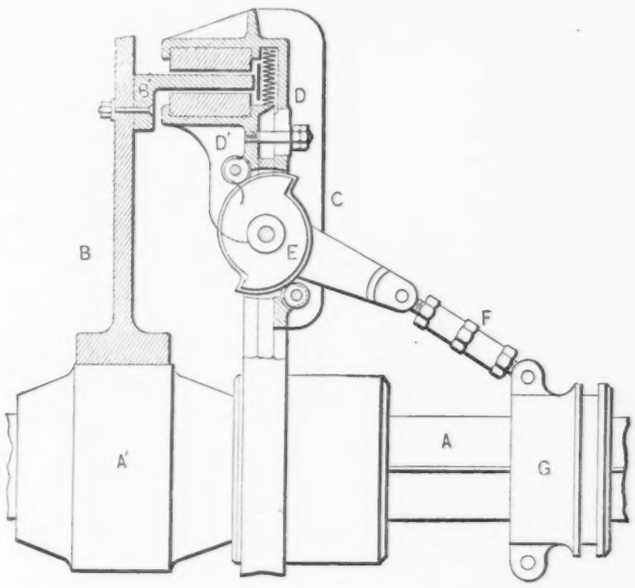


Fig. 2.—Longitudinal Sectional Elevation.

THE SHAW FRICTION CLUTCH.

The Shaw Friction Clutch.

N. Shaw of the Eagle Iron Works of Eau Claire, Wis., is the inventor of a friction clutch pulley. The pulley B is secured upon an enlarged portion of the hub A, this construction being adopted in order to permit the removal of the pulley from the hub when necessary. To the arms of the pulley is fastened a friction rim B′, by means of an angular flange and bolts or rivets. The cylindrical portion of the rim stands in range of the clutch mechanism as shown in Fig. 2. Next to the hub A′ is securely fastened the hub of the clutch frame C to the shaft A. On this hub are radial arms which serve as supports and guides for the clutching clamps D, the shanks of which are held together by a bolt so as to allow vertical motion. These shanks are provided with recessed heads into which bearing blocks are inserted and by means of which the cylindrical portion of the rim B′ is gripped when the clutching clamps are drawn upon it. In their normal position the clutching clamps D D′ are held away from the rim by the tension of the spring shown, whereby also two anti friction rollers of the clutching clamps are held in contact with the cam E. This cam has two symmetrical cam surfaces, one of which bears against the roller of the clutching clamp D, while the other bears against the roller of the clamp D′. This cam is pivoted to an arm and is provided with an arm forming one link of the toggle lever F, which at the other end is pivoted to the slide G, which is loosely fitted to the shaft and is kept from turning thereon by a spline or key. Provision is made for adjusting the length of the toggle lever so as to compensate for the wear of the friction clamps. An annular groove in the slide G serves, in connection with an ordinary forked shipper, to move the slide to and from the clutch frame C, and thus to clutch or release the rim B. Each arm of the clutch frame is provided with a mechanism similar to that described, and the mechanisms are connected with the slide G, thus securing a radially uniform action and avoiding one sided and unequal strains upon the parts.

A Siemens & Halske Chicago Branch.

It is said that the Edison and Thomson-Houston Electric Companies are soon to have a formidable rival in Chicago in the shape of a mammoth plant to be located there by the Siemens & Halske Company of Berlin.

This Berlin corporation has already organized its American branch, which the Chicago plant will virtually be. Papers of incorporation were filed with the Secretary of State, at Springfield, several weeks ago, and were taken out in the name of O. W. Meysenberg, Edwin F. Bayley and Otis H. Waldo.

At a meeting held last Thursday, the company were organized with these officers: O. W. Meysenberg, president; A. W. Wright, secretary, and the following Board of Directors: Arnold Von Siemens, George William Von Siemens, O. W. Meysenberg, A. Wright and Alexander Von Babo.

Mr. Meysenberg is president of the Wells & French Company, and he and Mr. Wright will have the management of the concern. Mr. Bayley and Mr. Waldo are merely attorneys for the new company, and Mr. Von Babo is a New York man representing the Berlin house in this country. G. H. Benjamin of New York is to have charge of all affairs relating to patents and their litigation.

The managers say it is their intention to erect a temporary plant in connection with the plant of the Wells & French Company, said plant to cost some $500,000. They will also erect a permanent plant as soon as practicable, and more than $3,000,000 will be thus expended. They expect this plant to develop into one of greater magnitude than any now operated in Europe, and they may even go so far as to build a town of their own and employ 4000 men

Mr. Meysenberg will look after the location, but it has been decided that it will be in the immediate vicinity of Chicago.

Members of this company say they will control the electric industry of the world as soon as some of the applications which have been filed in this country are issued as patents, and many changes, such as converting the cable lines of Chicago into underground conduit electric systems, are already being talked of. Such a system is operated successfully in Buda Pesth, Hungary.

The company have works at London, Berlin, Vienna and Belford, France, and have constructed nearly all the ocean cables laid.

One feature of the company's method of doing business is that in all their European plants the co-operative plan is used. By this plan the employees get a percentage of the profits in business, as well as fair wages. No strikes are experienced as a result of this system, and it may be used here in Chicago.

It is denied that the enterprise is a stock-jobbing scheme in any way, as the policy of the Berlin firm has been never to sell stock to an outsider. It is also claimed that the new company will have one great advantage over the other companies, inasmuch as they are hampered by no debts or a lot of little stockholders, and they can spend money freely on experiments or for developing new ideas.

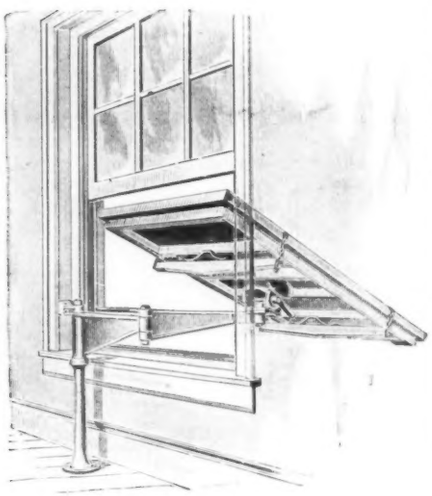
Baron Arnold von Siemens, a member of the Berlin company and a son of Baron Werner von Siemens, the company's founder, had much to do with locating this new venture in Chicago. He has been in America about two months, and went to Chicago to arrange for an exhibit at the World's Fair. He learned that such an exhibit would have to be divided among several different departments, and he decided that the best thing to do would be

to build a plant and locate there permanently. Hence his company decided to start their electrical business there, and it is predicted that it will be a great thing for Chicago.

The Solar Printing Frame.

An improved solar printing frame is made by the Philadelphia Engineering Works, Limited, of Philadelphia, Pa. The articulated arms carrying the frames are so designed that they may be pushed out of a window, and made to assume any angle. During cold weather the sash of the window may be lowered to the top of the main arm when the frame is outside and a lid hinged to the window sill thrown up, thereby shutting out all cold. When the frame is within the room the window may be lowered entirely. The room is not obstructed with tracks and a large frame lying in a horizontal position, as this type may be folded up and placed in nearly vertical position against the wall, occupying but little space.

In order to secure a good blue or other print it is important to have the frame as nearly right angles to the sun's rays as it is possible. Under these conditions a



The Solar Printing Frame.

print can be made in considerably less time, and come out clearer and more distinctly.

Where frames are rigidly fixed in a horizontal position the rays of light in the morning and afternoon make very acute or obtuse angles with the glass, thereby losing much light due to the increased opacity of the glass. The rays of light are also continually intercepting each other, due to the thickness of the glass, all of which retards the action of printing. The light is also very apt to find its way between the negative print and paper, when not closely united, resulting in blurred, indistinct work. These objections are overcome by this frame, since its construction will permit any angle to be obtained, by adjusting it at right angles to the rays of the sun at different periods of the day.

The bed frame is made of well seasoned white pine, made light in weight, consistently with strength, and covered with a layer of thick felting. The glass cover is hinged to the bed frame on the long edge and secured by means of two oak bars, provided with elliptic springs.

With this arrangement the glass may be brought to bear with a light or heavy pressure on the bed. When desired, the bed frame is provided with a double thick plate glass and covered with thick felting. This gives an absolutely level surface and prevents crimping of the paper.

The glass frame is to be preferred, since it will not warp as wood if exposed to all kinds of weather. To the bottom of the bed frame is secured a universal bearing provided with a cramping lever. This bearing is mounted upon the end of a jointed lever or arm, which may be supported upon a pivotal column or a strong bracket, firmly secured to the window casing.

Legislation Affecting Marine Boilers.

DIGEST OF BILL NOW IN CONGRESS.

Senate bill No. 1755 consists of 201 sections, of which those from 1 to 35, inclusive, refer to the inspection of vessels propelled wholly by sail, passenger barges, lake and coastwise freight barges being towed, upon whom the superintending of the administration of the laws relating to such inspection devolves, the qualification of such officials, termed inspector general of vessels and supervising inspectors, their salaries and duties, with power to establish regulations necessary to carry out the provisions of the law for the inspection and equipment of such vessels.

Boiler Plates.

The sections we are at present most particularly interested in are 36 to 96 inclusive, which refer to boilers and shafting. The act provides that before any material shall be passed for incorporation into marine boilers it shall first be subjected to inspection and tests. The plates shall be free from laminations, cracks, scabs or any other defect tending to reduce their strength, and of practically uniform thickness. Plates with defects sufficiently serious to reduce their strength more than 5 per cent. are to be rejected. It details the manner in which the tensile strength, elongation and other qualities of boiler material is to be ascertained. If the tests are satisfactory the material shall be passed for incorporation into the shells of marine boilers, except where the sheets would form part of the heating surface. The tests referred to in Section 37 are briefly these: Two pieces cut from diagonally opposite corners, one for tensile strength and for bending and quenching tests. The pieces may be cut either longitudinally or transversely. The skin of the test piece is not to be removed or the pieces prepared or reduced in size. The tensile test pieces shall be in length at least 14 inches. When prepared shall be subjected to tensile stress in the testing machine until it is ruptured. The test piece for quenching and bending shall be not less than 2 inches wide and 12 inches long; it will be heated to a cherry red and then plunged into water of about 80° F. It must be possible to bend it double around a curve without showing any cracks. The quenching test is to apply only to steel plates. For wrought-iron plates the specimen will be bent cold to an angle of 90°. For plates intended for furnaces, fire boxes, &c., the tests and requirements shall be the same. No wrought-iron plate with a lower tensile strength than 45,000 pounds shall be allowed when its thickness would be more than $\frac{3}{4}$ inch, and the steel plates of a lower strength than 58,000 pounds for shells or 50,000 for heating surface. The plates are to be stamped by the manufacturer.

It provides that the boiler maker shall inform the inspector when they have a new boiler to build and furnish him with a tracing, &c., and notify him when the pieces will be ready for the test pieces to be cut from them. The inspector makes an examination for laminations, &c. The further proceedings by the inspector and manufacturer are minutely set forth (sec. 42). Inspections are to be made at different stages of construction, and the boiler before use is to be subject to hydrostatic test. Butt straps when used, the straps for single use shall be on the outside and of no less thickness than the shell plate, and where double straps are used the thickness of each shall not be less than $\frac{5}{8}$ inch. These straps must be cut from plates and not from bars. A drawing of the kind of joint to be used is to be submitted before the work of laying out the rivet holes is begun, with certain details. Two from each 100 rivets are tested (46).

Pressure Permissible.

Section 47 gives the rule for pressure permissible in marine boilers. Where flat surfaces exist the inspector must satisfy himself that the spacing and distance apart of the bracing, &c., are so arranged that all shall not be of less strength than the shell. The strength of the stays supporting flat surfaces is to be calculated from the smallest part of the stay or fastening. Iron stays not exceeding $1\frac{1}{2}$ inches effective diameter and for all welded stays the strain is limitad to 6000 pounds per square inch. For unwelded stays over $1\frac{1}{2}$ inches diameter, 7500 pounds per square inch. Steel stays not over $1\frac{1}{2}$ inches diameter, 8000 pounds, and over $1\frac{1}{2}$ inches 9000 pounds. No steel stays are to be welded.

That the strength of flat plates supported by stays shall be taken from the following formula:

$$\frac{C \times T^2}{P^2} = \text{working pressure in pounds per square inch.}$$

Where T = thickness of plate in sixteenths of an inch (expressed as a whole number—*i. e.*, $\frac{3}{4}$ inch = 12).

P = greatest pitch in inches.

C = 90 for plates $\frac{7}{16}$ thick and below fitted with screw stays with riveted heads.

C = 100 for plates above $\frac{7}{16}$ fitted with screw stays with riveted heads.

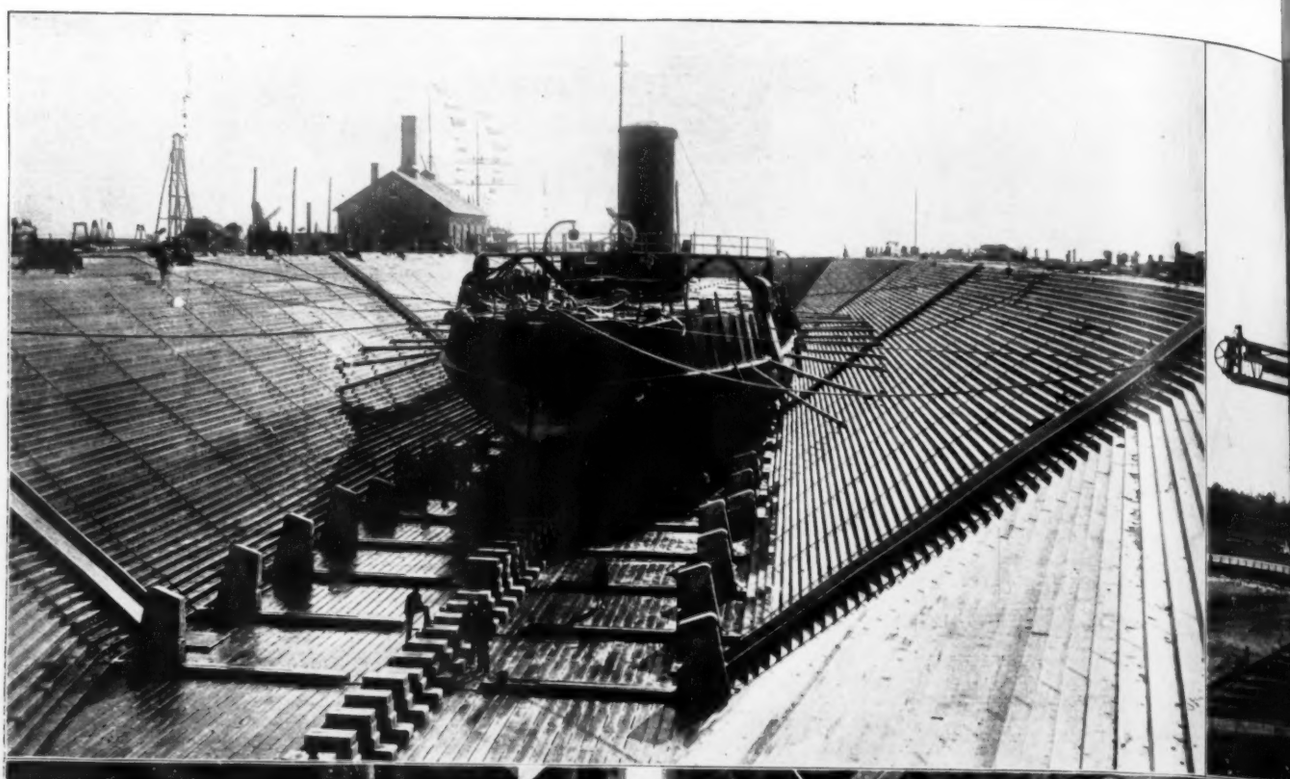
C = 110 for plates $\frac{7}{16}$ thick and under fitted with screw stays and nuts.

C = 120 for plates above $\frac{7}{16}$ fitted with screw stays and nuts.

C = 140 for plates fitted with stays with double nuts.

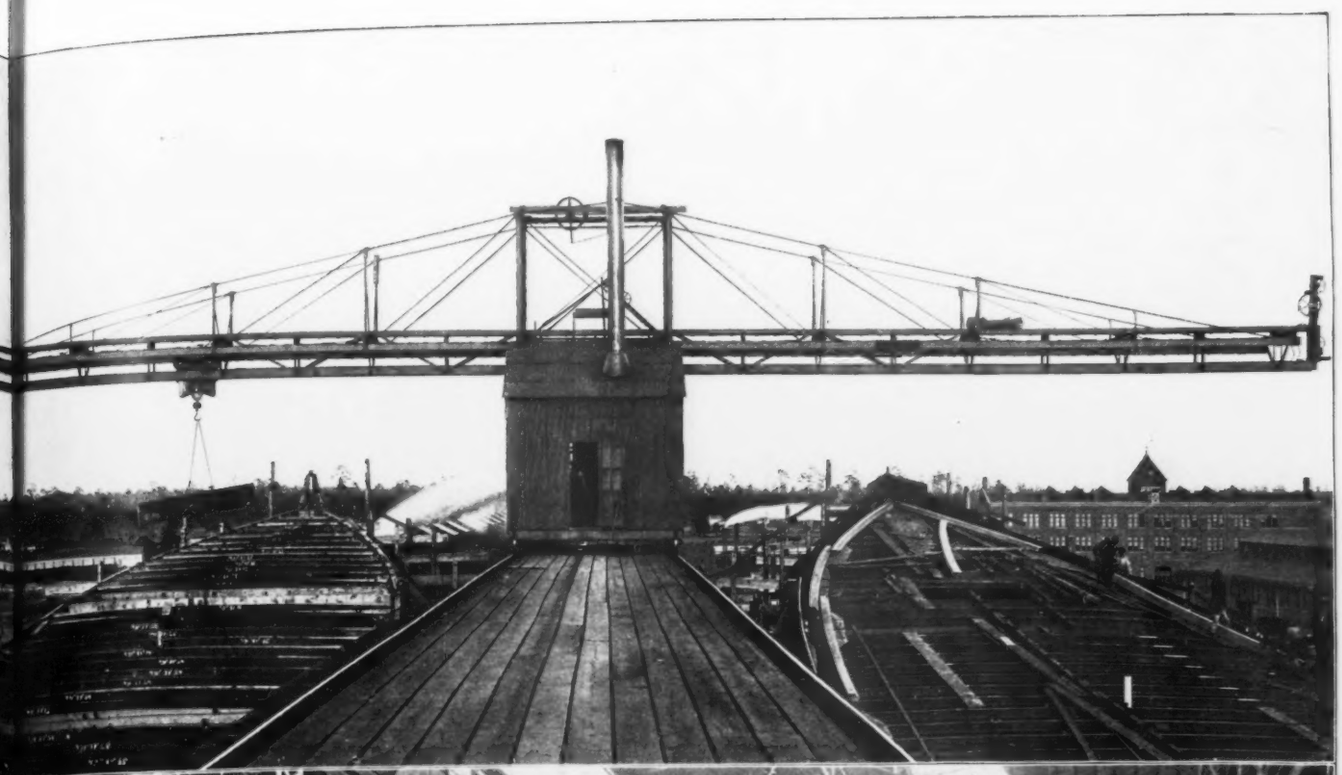
C = 160 for plates fitted with stays with double nuts and washers at least $\frac{1}{4}$ thickness of plates and a diameter of $\frac{2}{3}$ of the pitch, riveted to the plates.

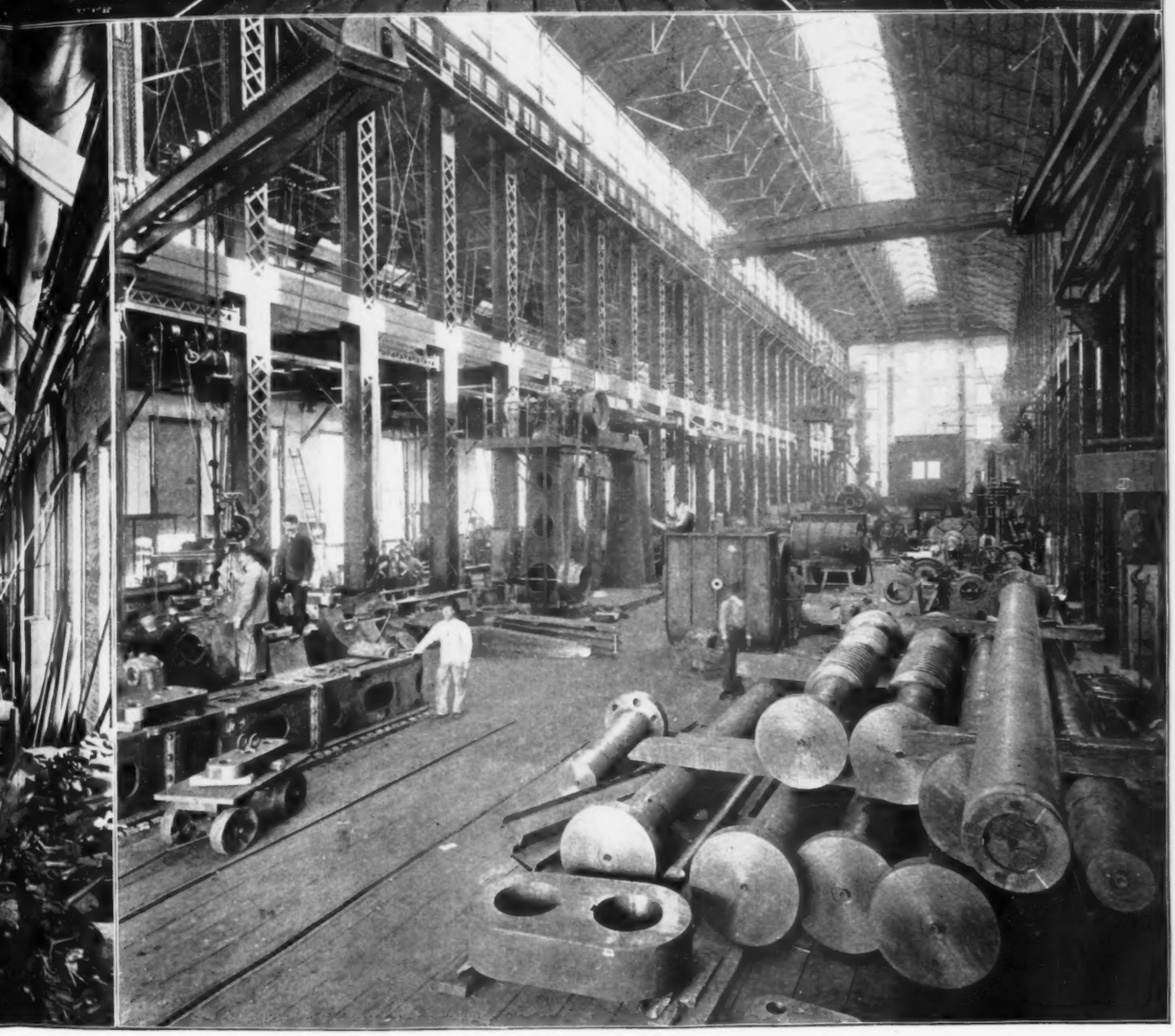
In the case of front plates the numbers in the formula shall be reduced 20 per cent. unless the plates are guarded from the direct action of the heat. Permission for a wider spacing of stays or braces may be secured. A formula is given for the strength of girders supporting the tops of combustion chambers and other flat surfaces. In determining the working pressure allowable in non-cylindrical shell boilers, the rules given for strength of braced surfaces are to be followed. The strength of the various parts in boilers of the coil, tubulous, or sectional type are to be calculated by the rules already given, and when the cylindrical portion is not unduly weakened by numerous tubes, a factor of five may be allowed, subject to increase. The tubes to be subjected to a hydrostatic pressure of 500 pounds. A rule is given (55) for determining the allowable working pressure for flues subjected to an external collapsing pressure. Where the longitudinal joints are lapped and riveted, 70,000 shall be used for the constant instead of 90,000, unless the lap is beveled, then 80,000 shall be the constant. Sections 57 to 61 inclusive refer to flues and rules



THE DRY DOCK.
FORGING SHOP.

THE NEWPORT NEWS SHIPBUI





TRAVELING DERRICK.
MACHINE SHOP.

LDING AND DRY DOCK COMPANY.

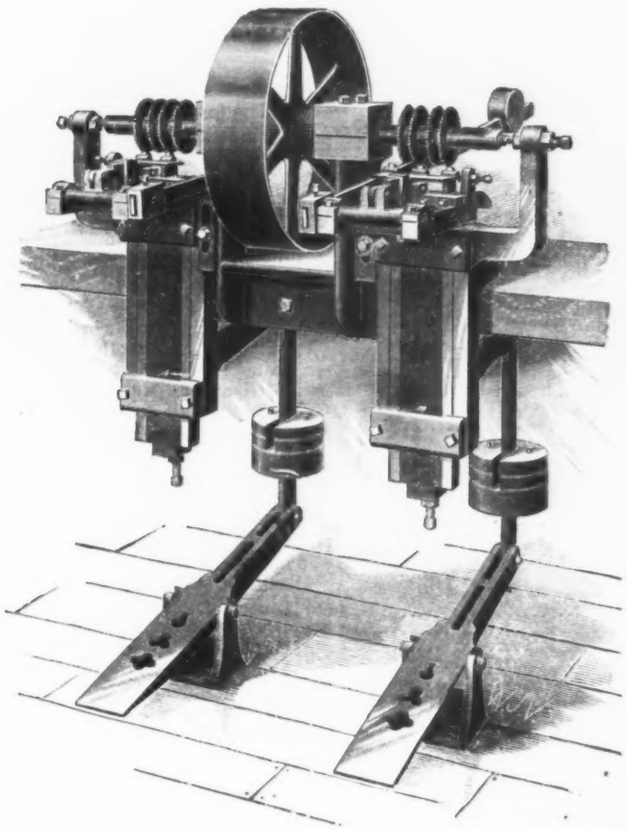
for determining the allowable working pressure under varying conditions. The act further provides that the boilers of foreign-built ships which have acquired United States register are subject to the same inspection in all respects as those built in the United States. Sections 63, 64 and 65 describe the course to be pursued in determining the allowable working pressure of the boilers of such vessels.

The act further provides for placing a composition valve or cock in the feed pipe, also that the manholes be provided with strengthening rings of the same thickness as the sheet and riveted to it; the area of the metal in the ring shall be equal to that of the hole. This rule is to apply to all other openings over 6 inches in diameter except such as are covered by valve casings. All fittings over 1 inch in diameter are to be attached by suitable flanges and bolts. Provision is to be made for a suitable feed-water heater, also for an auxiliary feed with independent feed pipe and check valve; prohibits the use of vertical tubular boilers on certain rivers. The space between the boiler and the nearest wood work is fixed. An ash pan shall be provided where the boilers have no bottoms to the furnaces. Section 74 relates to connections not entering the fire room. Section 75 provides that slip joints in steam pipes of steamers running in salt water shall have all their working parts of copper or composition, and that stop bolts shall be fitted to prevent the separation of the pipes. Steam and exhaust pipes, where passing through the bunkers or cargo space, are to be cased in. Section 77 relates to the location of the pipes leading through the bilge. The name of the manufacturer of the material, place where manufactured, the tensile strength, the name of the builder of the boiler, &c., inscribed on a plate shall be fastened to each boiler. Provision is made for an auxiliary or donkey boiler—for a fusible plug inserted in the highest part of the heating surface; for three gauge cock and a glass water gauge. Steam gauges heretofore passed shall be permitted to continue if in good condition. Section 83 refers to low-water gauges. Section 84 provides for the inspection and testing of boilers on towing freight boats on the Mississippi. Section 85 we noted in our issue of last week.

Sea valves and cocks, where practicable, shall be so bolted to bottom or bilge that the joint is accessible at all times. Description of one spring-loaded valve required. Rules are given for determining the requisite valve area (88). Special attention at the annual inspection will be paid to see that they are in a state of the highest efficiency. The feathers for guiding the valve must have sufficient clearance. Sections 91 and 92 relate to the duty of the engineer to blow the lock-up safety valves. The spring-loaded valve is to be fitted in a case with suitable lock and key. Besides the lock-up safety valve, each boiler shall have an additional safety valve under the control of the engineer. Section 95 furnishes the formula and table of the dimensions of the main engine shafting for screw engines only. Certain parts and stores are to be carried—these are specified. Section 98 relates to the certificate of competency of officers. Sections 99 to 108 treat of certificates.

The remaining sections treat of the qualifications of officers, of steamships, of officers of enrolled sailing vessels, of steamers, of qualification and examination of engineers, of pilots, of shipwrecks, of preventing collisions at sea, &c.; lights, &c.; of boats, &c.; of abandoning vessels at sea, of sighting an iceberg, &c.; of statement of collision, of power of light, &c.; of use of incandescent lamps, of lanterns, of color of glasses, of side lights, of steam whistles, &c.; of sound signals, of penalty for violating any provision of this act.

A. R. Whitney of New York has gone to Florida for a month.



THE ADT DOUBLE BUTT-MILLING MACHINE, WITH WEIGHT FEED.

The Adt Double Butt-Milling Machine With Weight Feed.

The machine illustrated herewith is for milling the joints of all kinds of cast door butts, and is designed to be attached to an ordinary bench. A gang of mills is mounted at each end of a horizontal steel shaft which is run from one pulley in the center.

The tables on which the work is fed up to the mills are provided with adjustable self-opening and closing chucks which hold the work while being milled, and when the tables are lowered, automatically release the work, permitting the operator to take out the piece and insert another and as the table is again fed toward the mills the chuck closes automatically upon the work, holding it securely. The table is lowered by a pressure of the foot to the treadle, and by raising the foot from the treadle the table is fed toward the mills by means of a series of weights.

One operator can with ease run one of these double machines, and by matching the halves of the butts during the milling process, any slight variation in the parts can be detected; this is the only method by which accurate work can be assured. Where a single machine is used for both parts, especially on large lots, the mills may become dull before the first halves are finished, which will cause a variation in size, and by the time the second halves are finished there will be so much difference in the two parts that some of them will not match; it will then be necessary to mill them over again or fit them by hand. In using a double machine and milling both parts at once, not only is much time saved in changing mills, but the butts are matched ready to commence drilling at once, and thus the two operations can be carried on together without the delay of waiting for the second half to be finished.

An illustration and description of an improved butt-drilling machine designed to be used in connection with the double butt-milling machine was recently given in *The Iron Age*. These machines are made by John Adt & Son, New Haven, Conn.

The success of the system used by the Burden Iron Company, Troy, N. Y., of giving annually cash prizes to workmen in the different departments of the establishment who have won distinction for the superior quality and the large quantity of work done, becomes more and more apparent each year. The system has been in force since 1881, and from the first it has tended to stimulate a healthy ambition and good-natured rivalry among the men. Prizes are given to puddlers, horseshoe runners at the steam and water mills and punchers. For puddlers seven prizes, ranging from $25 to $100, were given. For horseshoe runners there are prizes of $100, $75 and $50, and for punchers there are ten prizes, from $10 to $55. The work is examined each day, and every week the averages of the men are posted, so that all can see just how they stand. The system entails much extra work upon the office, but it has been found to be well worth the while. The prizes for the past year were recently announced. First prize winners were: Puddlers, Joseph Fletcher, $100; horseshoe runners, David Reese, $100; punchers, Bernard Dorley, $55.

Cornelius Van Done, 17 years old, sued the Chicago Drop Forge and Foundry Company for $15,000 damages because a steam hammer crushed one hand so badly that amputation was necessary. It was alleged that the machine was in bad condition when he was placed in charge of it. A jury awarded him $4000 at the trial of the case on the 1st inst.

The Newport News Shipyard.

[*With Supplement.*]

The building of a shipyard, in the full meaning of the term, is an undertaking of vast magnitude, since it requires the complete equipment, perfect in the minutest detail, necessary to the prosecution of several distinct industries. The man capable of conceiving and directing to a successful issue such an undertaking must possess characteristics enabling him to comprehend his project perfectly, its minutiæ and its entirety, to see the significance of each step, and above all, to keep constantly before him the mind's picture of what he is striving for in its fullest perfection. He must abound in enthusiasm, and have the utmost confidence in the ultimate success of his plans, and have wisdom to shape his course in accordance with events not yet developed. To have done all this and to have seen the scheme finished and working with all the smoothness and accuracy of a well-designed machine is the only reward anticipated. This is what has been done at Newport News.

History.

The Newport News Shipbuilding and Dry Dock Company, the officers of which are C. B. Orcutt, president; I. E. Gates, treasurer; F. H. Davis, secretary; like many other enterprises of unusual magnitude, had its conception in the mind of C. P. Huntington, and was intended as an auxiliary to his other projects at Newport News, embracing the building of the city and the completion of a great railway terminus. Newport News seemed to be a favorable location for all these works, by reason of its splendid climate, its proximity to raw materials and its accessibility by water. It is located upon the southerly point of the Virginia Peninsula between the James River and Chesapeake Bay. The level plateau upon which the city stands is well elevated above the broad waters of the James River estuary. The waters immediately in front of Newport News, rendered historical by the memorable conflict between the Monitor and Merrimac, have sufficient anchorage for the largest ships, and are approached by broad channels of ample soundings, the curvature of the shore line forming at all times a safe protection against storms sweeping in from the ocean, and all uniting to make the finest harbor on the coast. The Chesapeake and Ohio Railway, the ocean terminal of which is here, provides railroad connection with the principal cities of the West, and quick transportation from the coal and iron regions of Virginia and West Virginia.

Ten years ago the present site of the city was marked by only one human habitation. Now there is a well ordered city having a population of 8000, and boasting of a single establishment which alone gives employment to 1500 men. Commodious and pleasant houses have been provided for the employees, built largely of brick and fully equal in style and accommodations to workingmen's houses in other sections. There is a tendency to gradually improve the condition of the workingmen. Efforts are being made to induce them to own their homes. Mr. Huntington in his desire to better the condition of employees, has, at his own expense, erected a building and endowed a full grade school free to the children of the employees of the shipyard, who are taught the English branches, modeling in clay, sewing and other practical studies. It has been tritely said that big things, to be permanent, must grow slowly. It is impossible to build a shipyard at once, as it were; the work must go forward step by step and the branches appear as they are needed.

The construction of a mammoth dry-dock, having a length of 600 feet, a breath of 130 feet and a depth over the sill of 25 feet, and able to receive the largest vessel afloat, was the first step in the establishment of the Newport News shipyard. Upon its completion work began to come in, when repair shops were constructed, and shortly afterward word was given by Mr. Huntington to put at Newport News the finest shipbuilding plant in the world, the idea in his mind being to do his part as an American citizen to restore the American flag to its place in the ocean carrying trade. From the very first the method pursued has been to employ home talent and home machinery in the manipulation of home material. The yard is American throughout. It follows no pattern from across the water, neither does it contain within its borders a single imple ment not designed and made in American works. It carries the idea still further and consumes only the raw and manufactured material found at home. As it now stands the yard is fully equipped for building any vessel of the merchant marine class.

Buildings.

By referring to the accompanying map the location of the several structures named below may be ascertained:

	Feet.
Office building, three stories, brick	40 x 200
Pattern and joiner shop, three stories, brick	60 x 300
Machine shop, iron and brick	100 x 300
Boiler shop, iron and brick	100 x 300
Blacksmith shop, brick	100 x 300
Bending shed, iron and brick	60 x 127
Ship fitters' shop, iron and brick	60 x 320
Ship blacksmith shop, frame	120 x 308
Pipe fitters' shop, frame	50 x 308
Power house, brick	40 x 130
Lumber shed, two stories, frame	40 x 300
Pump house, brick	43 x 60
Paint shop, brick	50 x 160
Stable, two stories, brick	40 x 60
Timekeeper's house, frame	50 x 40
Fitting-up shop, brick	50 x 175

Pigrs.

No. 1	60 x 900
No. 2	60 x 350
No. 3	80 x 350
No. 4	60 x 550
Outfitting basin	900 x 500

Ship Ways.

	Feet long.
No. 1	400
No. 2	400
No. 3	450
No. 4	450
Nos. 5, 6, 7 and 8, each	500

An examination of the yard reveals many noticeable and admirable features. The buildings are so arranged or grouped that all the work carried on is progressive—that is, the material enters at one place and without in any instance retracing, and thereby requiring undue handling, its path passes through the departments until it reaches its destination. Each building is well adapted to its works, and all are provided with ample head room and plenty of light. The track facilities are ample, and wherever desirable traveling and stationary cranes are found.

Building the Hull.

We have first the drafting room, located in the general office building, where all the infinite detail essential in a business of this character emanates. The next step is to the mold loft, 306 x 60 in the clear, or the largest in the world; from there you follow down to the bending shop, where the frames are given shape; to the beam welding department, where the knees are welded on the beams; to the ship shed, where the plates are marked, punched, planed or sheared, according as may be required, and then to the framing shed, where the frames are assembled and riveted to the floor plates and beams, much of that being done by hydraulic power. When a frame has thus been assembled it is handled by hydraulic lifts to a transfer car, run across the yard under power cantilever cranes serving ships in construction, there picked up and transferred to the part of the ship where it is destined to go. All material is handled by power cranes during construction; weights of at least 25,000 pounds can be handled by the system in vogue. At present the plates and shapes largely come from Pennsylvania, although Virginia is now beginning to furnish most excellent material entering into ship construction in certain departments.

Between the two 500-foot ship ways is an elevated structure for a traveling derrick of such length that its arms cover the outer sides of the ways and of such power as to be able to lift, convey and deposit in place any piece entering into either vessel being constructed alongside of it. This machine has been found to be most useful and to facilitate and expedite the final operation of assembling.

Machinery.

The forgings for the engines are mostly made in the smith shop, where hammers varying in capacity from 600 to 6000 pounds are operated. From thence engine forgings go into the machine shop to be handled in the usual way. The shipyard is equipped for work of the largest size known in shipbuilding, and has a margin for increased dimensions in all of the tools. Some special tools we may note are a screw-cutting lathe with 126-inch swing; a mammoth cylinder-boring machine, capable of boring 18 to 108 inches in diameter; a planer with a capacity for planing vertically 22 inches by horizontally 23 feet; also a 24-inch slotting machine, besides the usual large planers, boring machines, &c.

All material is handled by traveling cranes and hydraulic hoists. Following the boilers, it will be noted that the immense boiler plates of the present day are handled by hydraulic cranes from cars in the yard, swung into the boiler shop, where they are again moved by traveling cranes, and are wrought into proper forms by new and ingenious devices, such as hydraulic flangers, rolls, &c., and riveted up by mammoth riveters exerting a pressure of 150 tons on the head of the rivet.

For the wood work of a vessel the yard is admirably equipped. A brick building, 60 by 300 feet, three stories in hight, is fitted with machinery in the two lower stories for working timber from the rough state to the finished articles needed for the joiner work, the upper story being occupied as a pattern shop, fitted with all the latest appliances for this work.

Distribution of Power.

Upon consulting the map it will be noticed that the power house is located near the center of the yard. All the several departments are driven by independent engines, and many of the machines are operated by individual engines. This has been found to be economical and advantageous in many respects. It also gives opportunity for working over-hours on any special line without running a whole length of shafting; again, the tools were more easily arranged than they would be if they were dependent upon the main line of shafting. They are also less liable to cripple the shop by an engine breaking down.

A great feature in respect to the operation of this plant is the centralizing of its steam power. All the boilers from which power for driving tools is received are erected under one roof in a fire-proof building, steam being carried a distance from 400 to 500 feet in either direction in a steel subway, varying from 6 feet to 8 feet in diameter, which also serves for a hot blast, driven by a large fan, for heat-

ing purposes. It is found that great economy is secured by thus pooling the steam. In this power house are located the hydrulic accumulators, the blast and exhaust fan for smith shop, the electric light plant and the pumps, including fire pumps, all of which are under the eye of one engineer.

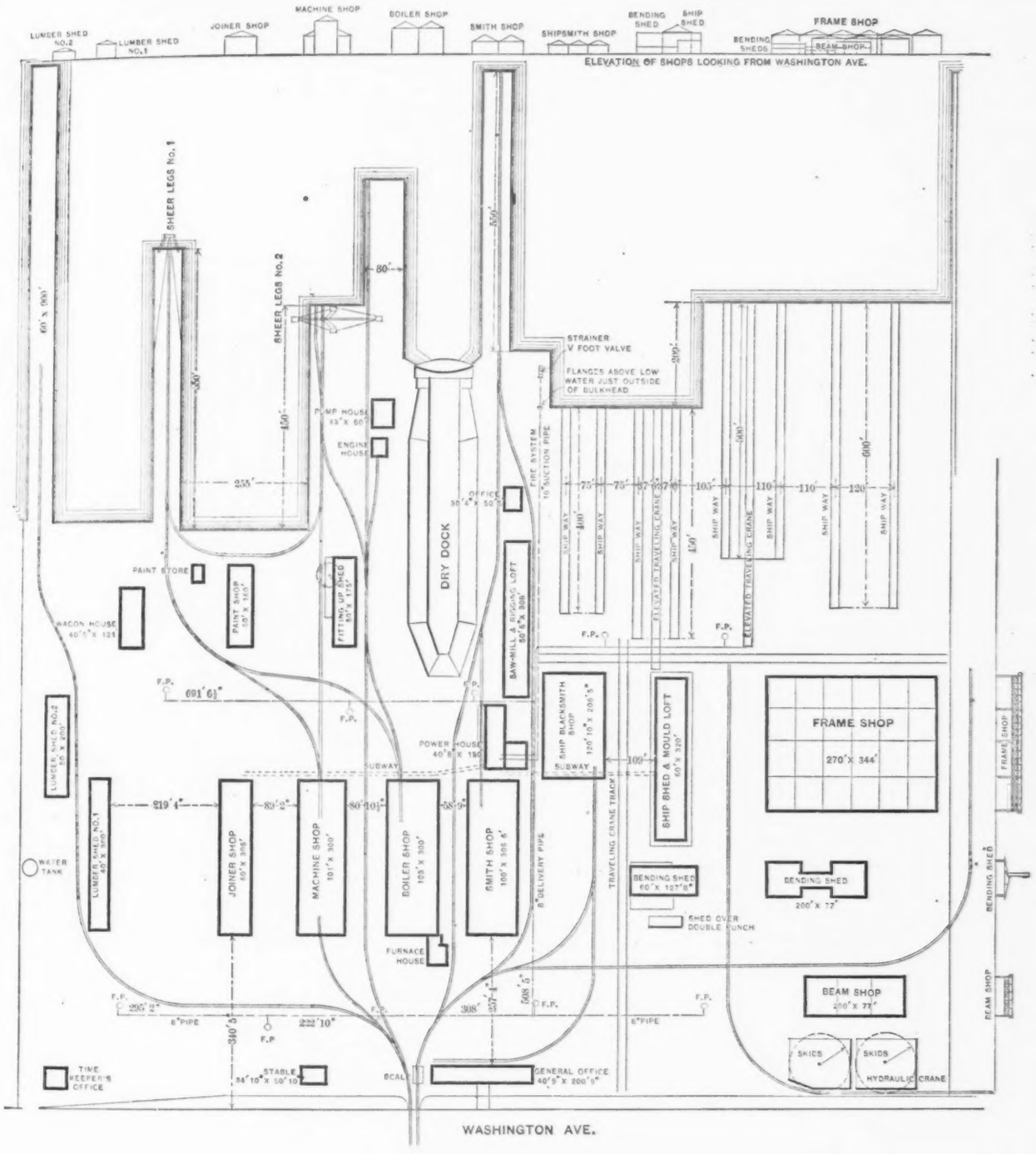
Fire Protection.

Careful attention has been given to fire protection of this enormous plant, the idea being that an "ounce of preventive is worth a pound of cure." A large fire pump has been located in the fire-proof power house capable of throwing six streams of water. This pump is connected with the James River by a 10-inch main and serves 8-inch fire mains laid throughout the yard, with fire plugs at convenient distances. Several thousand feet of hose on reels are housed at various parts throughout the yard ready for an emergency. As soon as the city water is introduced, which will be within a few months, this fire service will be connected with that also. As a particular protection to the wood working building the best and most improved system of automatic sprinkling has been introduced, served by a large tank kept constantly full of water at the proper elevation.

At present ways have been put in place for the construction of four vessels at one time. Shortly four additional ways will be built, accommodating ships 500 feet in length and over. It will thus be seen that eight ships can be under process of construction at one time. Later on, as necessity demands, this capacity will be increased, and unless the company's views with respect to the American merchant marine are far out of the way, it will not be long before this yard will have a capacity for constructing at one time ten ships, giving them an opportunity of turning out a full-fledged ship every six months. This is entirely independent of all repair work.

The Result.

Two iron vessels have already been constructed and two others will soon be launched, each having a carrying capacity of 5000 tons. The latter two are the largest ships ever built in America, while a keel for a sister ship of the same size will be laid in a few days. The prospects for the yard are exceedingly bright, contracts for work extending far into the future having been made. Over 100 vessels have been dry docked since the completion of facilities something over a year ago.



MAP OF NEWPORT NEWS SHIPBUILDING AND DRY DOCK WORKS.

An interesting experiment was made at the works of the Birmingham, Ala., Iron Works, last week. It was a test of the Hastings process of producing steel from Alabama iron.

THE WEEK.

A rifle which will throw a stream of vitriol to the distance of 70 meters has been offered by a French officer to the Minister of War. It is designed for use against savages only, to prevent their frenzied assaults.

The Rotch Spinning Corporation was organized at New Bedford, on the 27th ult., with a capital stock of $500,000. The corporation is to engage in the manufacture of hosiery yarn and will erect a mill of brick, two stories in hight, 500 feet long and 130 feet wide. It will contain about 20,000 spindles.

A project for a covered waterway, 60 feet wide, to be built on the westerly side of the Harlem River from the easterly side of Third avenue to 165th street, and filling in the river between the points named, so that the avenues and streets of Harlem may be extended into Morrisania, was presented to the Commissioners of the Sinking Fund, on the 2d instant, by Mr. Simon Stevens. This would permit the river between Third and Eighth avenues to be closed.

With a population of about 500,000 Uruguay produces not less than 5,000,000 bushels of grain every year. The largest export is wool, valued at $6,000,000 per annum. Beef comes next on the list in quantity, valued at about the same figures; and hides third, of which not less than $3,500,000 are shipped every year. Then comes wheat, about $3,000,000 worth; corn, $1,000,000, and other agricultural products footing up to nearly $2,000,000 worth. All these have more than doubled during the last ten years.

A dispatch from Victoria, B. C., of the 28th ult, is as follows: The news is posted in business places stating that American silver coin will not be accepted, save at a discount of 5 per cent. The Post Office will take the same action.

It is reported that there are strong indications that the Santa Fé will build from Paul's Valley to Wichita Falls, and later to a connection with their Southwestern line at Ballinger by way of Albany.

The officers and directors of the Whiskey Trust were arrested at Chicago, on the 29th ult., under an indictment found at Boston.

The second mortgage bondholders of the New York and Northern Railway Company met in New York on the 2d inst., and, on motion of W. C. Whitney, approved of the recommendation of the committee of last year, that foreclosure of the second mortgage be avoided, and 5 per cent. second preferred stock be substituted for the second mortgage 4 per cent. A committee of five was appointed to prepare a plan for the reorganization of the company.

A dispatch from Cleveland, Ohio, March 1, represents that the great stock of wheat in the Northwest makes freight rates firm, and would materially prejudice the rates for iron ore, were it not for the large number of new vessels which will be ready at the opening of the season.

The voyage of the new ship H. D. Troop, from Greenock to New York, in 14 days, which is remarked upon as a very quick trip, was nearly equaled by the trips of the Racer and Plymouth Rock to Liverpool in 1852, so that there has not been much gain of speed in sailing vessels. Marine engines only have shown great progress.

The report comes from Brussels that the Belgian Workingmen's party, and the Miner's Federation are taking steps to restrict the output of Belgian coal. This may lead to a big coal strike in Belgium, as the Belgian mine owners are said to have come to a secret understanding with the English coal owners.

Aluminum, in a paper published in a German pharmaceutical journal, was held to be unsuitable for vessels designed to hold preserved food. Professor Lunge, on the other hand, is reported to hold that the objection is not well taken, and that injury could not result unless the quantity of aluminum in the compounds were many times increased.

Great gold deposits, near Breckinridge, are reported from Denver, Col., and it is said that prospectors are coming in from all directions.

The Columbia Cotton Mill Company, an enterprise controlled almost exclusively by colored men, on the 1st inst., at Chicago, purchased a large tract of land 6½ miles from that city on the Eastern Illinois road, on which to commence the building of a plant for the manufacture of cotton cloth. The site of the mills has been named Butler City. An attempt will be made to produce a superior fabric and to bring into play in manufacturing and mercantile life industrial forces of the colored people never before utilized.

The Mexican International Steamship Company of Philadelphia is practically an assured fact and the first vessel of the line laden with American products and bound for Cuban and Mexican ports will leave that city in about three weeks. The present purpose is to charter, not purchase steamers, and three vessels are now under consideration. The office is at 35 South Third street.

The first train of American cars which ever ran on an English railway made its journey on the 2d inst., from Charing Cross to Hastings and back, on the South-eastern Railway. It consisted of four drawing rooms, one buffet and two baggage cars. The cars are exact duplicates of those on the limited vestibule trains of the Pennsylvania and New York Central Railroads.

The New York Chamber of Commerce again put itself on record, and unanimously, on the 3d inst., against the forced coinage of silver.

The report comes by way of China that the output of the New Caledonian nickel mines is to be absorbed by the French Government for the manufacture of the Lebel cartridge cases.

The sisal grass of Yucatan grows in long blades, sometimes to the length of 4 or 5 feet, and when dry the blade curls up from side to side, making a cord which is stronger than any cotton string of equal size that has ever been manufactured.

The usual output of logs for the region of the Black River, Wis., and its tributaries, is 150,000,000 feet. The mild weather which has prevailed in that vicinity has reduced the cutting to 70 per cent. of the usual amount.

Notice has been given in the Canadian Parliament of an intention to move a resolution declaring the expediency of re-imposing a duty on saw logs exported to the United States. Also of imposing a duty upon spruce pulp wood destined to these States.

During January 891,048 bushels of Kansas wheat were marketed, and from August 1 to February 1, 9,850,695, an increase of 1,069,847 bushels as compared with the similar period of 1890-91.

A delegation of about 40 residents of the annexed district called upon the Mayor on the 1st inst., and asked him to favor the building of a new bridge across the Harlem River from First avenue to Willis avenue. They accepted the Mayor's suggestion to allow the matter to rest until the determination of the question as to bridges at Second and Third avenues.

The Supreme Court of Ohio, on the 1st inst., indorsed a decision in the *quo warranto* proceeding against the Standard Oil Company, declaring illegal the trust agreement between that company and other oil concerns, but it did not annul the charter of the Standard.

The administration of President Diaz of Mexico was indorsed with enthusiasm by a large meeting of manufacturers and bankers held at the capital a few days ago.

An order by the authorities in Newark, N. J., that all trains on the Pennsylvania, Delaware, Lackawana and Western and the Central Railroad of New Jersey stop before reaching their respective crossings at the principal streets, is likely to be resisted.

A California railroad president is active in promoting a movement to break up the large wheat farms of the State into small holdings in the hope of attracting settlers.

The *Financial Chronicle's* compilation of railroad earnings for the year 1891 comprises 219 roads, with a mileage of 135,612, so they are unusually complete, the total mileage of the country being about 170,000. The gross earnings increased $47,067,580, and the net earnings $22,566,424. The following are the figures in full:

	1891.	1890.	Inc. per ct.
Miles.....	135,612	132,811	2.11
Gross earn	$1,103,636,503	$1,056,568,923	4.45
Op. exp...	750,282,585	725,771,429	3.38
Net earn..	$353,353,918	$330,797,494	6.82

This result was reached notwithstanding the depression in the early part of the year.

It is estimated that 10,000 tons of American hemp were converted into binder twine in this country last year, and that the amount of wages distributed by this industry was $2,000,000.

The Colombian Government has granted to Ranson B. Jimero the exclusive priviledge of erecting lighthouses at Colon and Panama.

The Anchor Line of steamers has extended its service by the establishment of a new line between New York and the Colombian ports, calling at Kingston.

The consolidation of the elevated railroads of Brooklyn, with a capital of $40,000,000, is under consideration.

In Brooklyn they are considering improvements in the building laws. A proposition to have automatic trap doors to close air shafts and elevators met with disfavor. Another proposition was that elevator shafts should be lined with tin, that drafts between floors and ceilings be precluded, and that all frame buildings be lined with brick.

In the case of the schooner Sayward, which was seized and forfeited in the District of Alaska for violating the law regulating the capture of seals, the United States Supreme Court has refused to prohibit the carrying out of the decree.

The iron and oil magnates respectively vie with each other in generosity. If Carnegie has for his pet object the Pittsburgh Library, Rockefeller has the Chicago University, which to date has received $2,600,000.

In his report accompanying the reports of the Special Commissioners of Immigration sent abroad last summer, Secretary Foster recommends that the present tax

of 50 cents paid by each immigrant on landing in this country be changed to a tax of $1 for each immigrant carried, to be paid by the steamship companies.

The latest fad in yacht building is a metallic "fin" extending from the bottom of the boat amidships several feet fore and aft, in lieu of a center-board. The Herreshoffs are using Tobin bronze.

The constitutionality of the McKinley tariff act has been upheld by the Supreme Court.

Reports from Brazil indicate chronic discontent. Two or three governors have been deposed, and the naval and military authorities are at loggerheads.

It is officially stated that Mexico exported last year in coin and bullion $36,256,362, while miscellaneous exports amounted to $27,000,000, the principal items being fibers, coffee, copper ore, hides, wool and lead. The United States took 71 per cent. of the whole. The export trade has doubled within a few years.

The new Sound steamer Maine, built by the Harlan & Hollingsworth Company, made 17.6 miles per hour average speed on her trial trip, the machinery working perfectly.

High authority in the British Government admits that the reciprocity treaties between the United States and Brazil and San Domingo place British goods at a disadvantage.

The opinion is entertained that the British Government is maneuvering with a view to having a Canadian sealing vessel seized by our cruisers, so that a case may be made in the Federal courts which would command a hearing on the merits. The Sayward case was turned out of court, but in the absence of a renewal of the *modus vivendi* our Government would be obliged to make seizure or abandon the seals to extermination.

Investigations are proceeding at Chicago and Minneapolis in relation to the Cordage Trust, with a view to indictments, as in the case of the Whisky Trust.

Attention is turning to the selection of a suitable color for war vessels. White is easily defaced on steam vessels, and is expensive. It is easily seen at night.

It is reported from London, March 4, that the coal operators have determined to make no further advance in the price of coal

The census of New York City, gives 1,800,891, exclusive of the inmates of public institutions, of which the returns were sent to the Secretary of State, perhaps 15,000. The Federal census was 1,515,501.

The new steamboat Maine, of the Stonington line, is built of steel, and is 310 feet over all, 302 feet 7 inches on the water line, 60 feet beam over guards, 44 feet beam on water line, and draws 12½ feet. She is fitted with a triple-expansion engine with four cylinders. Her propeller is four bladed, and is 13½ feet in diameter. She arrived on March 4, from the yard of the builders, Harlan & Hollingsworth Company, Wilmington, Del., running a distance of 120 statute miles in six hours.

The Youghiogheny River Coal Company on March 3 purchased from heirs of the Alexander King and John I. House estates, Edward House and the Allegheny Coal Company 800 acres of coal property in Westmoreland County, for a price approximating $230,000. The property will be worked for coal at once.

Brooklyn's population, according to the State enumeration, is 955,338. The Federal census showed 836.032. The population of the outlying towns is returned as 32,767. Total of Kings County, 988,105. This does not include some 1800 inmates of the county institutions, of whom returns were sent to Albany.

The news comes from Joplin, Mo., that the Empire Zinc Company have just entered into a contract to ship 50 tons of spelter to England during the month of March. The shipment will be a trial order.

The Governor of New York has approved the bill which appropriates $800,000 for continuation of the work upon the Capitol. The cost, up to the present time, is $18,593,243.58, and it is estimated that a further appropriation of $1,145,000 will be needed. This would make the total $20,843,243.58.

It is reported that timber robbers are making great havoc in the Adirondacks, indiscriminately upon State and private lands.

The Thomas and Gilchrist Patents.

The petition of the Dephosphorising and Basic Patents Company for the prolongation of seven patents granted between March, 1878, and September, 1879, to S. G. Thomas, and for the prolongation of a patent granted in October, 1880, to Thomas and P. C. Gilchrist, in connection with the manufacture of basic steel, was heard before the Judicial Committee of the English Privy Council. The judgment was as follows:

"In this case the petitioners have asked for a prolongation of their patents. They show, on the face of their accounts, that they have received a very large amount of profits. The profits of the English patent are stated by themselves to amount to upward of £128,000. Besides that the profits of the foreign patents, which are material circumstances in the case, though they do not stand on quite the same footing as the English patent, amount to upward of £138,000. Now, no case has been discovered in which a prolongation of a patent has been granted where a patentee has received as much as £20,000, so that on the petitioners' own showing the profits of the English patent alone are six times as large as any amount on which their lordships have found themselves justified in reporting to Her Majesty that the patentee has not been adequately remunerated. Their lordships must say that they find it very difficult to conceive that, if they were to go through the whole case, as they have been invited to do, and if the witnesses showed that there was very great merit in this case, great and unusual, they find it difficult to conceive that it would have been so great and so unusual beyond the case of other patents, as to warrant them in doing that which is absolutely necessary for a prolongation of a patent, reporting to Her Majesty that the patentees have been inadequately remunerated. At all events such a state of circumstances makes it incumbent in the highest degree upon the petitioners to show the full extent and particulars of their remuneration. Now, their lordships do not rest any objection to the accounts upon the circumstance that the licensees' profits have not been stated. They consider that that is a matter which may or may not, according to the circumstances, be incumbent upon the petitioner to state; and without going into the circumstances of the case, they are not prepared to say that in this case the petitioners were bound to state the profits made by those licensees who have paid royalties. Nor will their lordships rest upon another objection which has been made to the accounts—namely, the lumping together of a considerable number of items by way of stating expenses as a set-off against the profits. That, again, is a thing which may be justifiable under the circumstances, and it depends upon each case, as I consider, whether it is or is not justifiable of the patentee to state his items in lump, or whether it is necessary to disentangle, so that they may be judged of separately. But the case of persons who were assignees of one-third of the patent, and who were and are still in the enjoyment of a free license, stands upon an entirely different footing. It appears from the petition that in the year 1879 Messrs. Bolckow, Vaughan & Co. agreed to take up the invention upon condition of having a free license, and also an assignment of a third of the patent. Their lordships take it from the petition, supplemented by the statement at the bar that in the year 1882, when the present company were formed, that third of the patent was assigned by Bolckow, Vaughan & Co. to the present petitioning company, and that Bolckow, Vaughan & Co. received, in lieu of that, a number of shares in the petitioning company, and the profits of a third of the patent are represented by the dividends on those shares, and are accounted for in this sum of £128,000 odd. But Bolckow, Vaughan & Co. remained owners of the third of the patent, at all events, till the year 1882, and they have had a free license ever since, and have worked apparently on a very large scale under that license. Now, all the profits that were made by virtue of the assignment of the third share in the patent are properly profits of the company, so far as the manufacturing profits are assignable to the patent, and all the profits that have been made by the use of a free license, as compared with others who paid royalties for their licenses, are also profits of the patent. Now, the accounts show absolutely nothing of those two items. How large they are we do not know. We could not tell without further accounts to what extent the remuneration has gone beyond the amount admitted. Upon that ground their lordships think that this case falls distinctly within the principle of Saxby's case, and the now numerous set of cases which have followed Saxby's case, which they need not refer to and particularize, because they are matter of familiar knowledge to all. They hold that the accounts are inadequate, and the petition must be dismissed, with costs; but their lordships consider there should be only one set of costs among the objectors."

The petition was consequently dismissed, with costs.

In addition to the handsome library erected and furnished some time since by Andrew Carnegie as a gift to the city of Braddock, Pa, Mr. Carnegie is now having erected a large club house, at a total cost of about $60,000. The latter will include a well equipped gymnasium, an auditorium with a seating capacity of 2000 and all the luxuries and conveniences incidental to a model club house. The club house, as well as the library, will be free to the employes of the Edgar Thomson Steel Works, and to others at a nominal fee.

Plans for a new machine shop, providing for a three-story brick building, 120 x 45 feet, to cost $25,000, have been submitted to the trustees of the Polytechnic Institute, at Worcester, Mass. The shop will probably be built.

In referring recently to the large engines now under process of construction by William Tod & Co. of Youngstown, Ohio, for the Pennsylvania Steel Company, we erroneously stated that the engines were to go to the Sparrow's Point, Md., plant. The engines, which will develop 4000 horse-power, are for use in the new universal mill of the Pennsylvania Steel Company, at Steelton, Pa.

The Iron Age

New York, Thursday, March 10, 1892.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - - BUSINESS MANAGER.

An Impending Crisis.

Unless all signs fail, there will be a complete readjustment of wages this year in the iron trade. This readjustment will be on a materially lower basis than that ruling at present. It is foreshadowed by occurrences which have taken place in important branches of the trade and in various sections. From present appearances the reductions in wages are likely to be burdensomely heavy for those who will have to bear them. This is an unpleasant condition of affairs to face, and it is with ill grace that the necessity of such action is admitted after such magnificent prospects for business as were held forth this year. The general expectation has prevailed that the heavy crops of 1891 would bring about such a period of prosperity that prices would advance and wages would be raised. The fallacy of such hopes, while the rest of the world is shrouded in financial gloom, is now being realized.

The first stroke of the lightning which is playing in advance of the approaching labor storm has hit the puddler. The very low price of soft steel billets at Pittsburgh which has latterly prevailed could have no other result than to displace the dearer puddled iron. So radical has been the change made in a brief space of time at Pittsburgh that entire gangs of puddlers and all workmen associated with them in puddling iron have been discharged without any prospect of re-employment in their old vocation. The movement promises to continue until puddling at Pittsburgh will exist only in history. The Western puddler has made a gallant fight against the advance of steel, and only a few months since his hold on the iron trade seemed to have been getting firmer, if any change whatever could be observed in his attitude. So shrewd an observer as Mr. Swank was led to say in the introduction to his last edition of the "Directory to American Iron and Steel Works," which has just appeared: "The production of puddled iron in this country is not by any means a decaying industry, as we have already stated that our production of rolled iron in 1890 was greater than ever before in our history. Our puddling furnaces increased from 4882 in November, 1887, to 4914 in November, 1889, and from the latter date to January, 1892, there was a further increase to 5120."

It is, of course, possible that the puddler is merely suffering from a temporary occultation, and there is no danger of a total eclipse of any serious duration, much less of extinction. But the annual capacity of our Bessemer and open-hearth steel works has increased in the past two years, according to the same authority, from 7,000,000 net tons of ingots to 8,280,000 tons, or over 18 per cent. This enormous capacity, taken in connection with the penetration of the steel industry to very remote sections of the country, means much that is ominous to the puddler. He has the proud consciousness that up to the last moment his wages in the entire West have been maintained at $5.50 per ton, but that will afford very little consolation in the future if he can find no work. The question comes up naturally, Would a reduction of even 50 per cent. prolong his mechanical life? This may well be doubted, unless there is a speedy revival in the iron trade that will cause an advance in the price of soft steel. Only a few days since a prominent Pittsburgh manufacturer made the statement that soft-steel billets had been sold in his city at about the same price as old iron rails. Muck bar was so much higher that it was almost unnecessary to make the comparison. There are, of course, special causes in some branches of the trade, and there are remote sections of the country where steel billets cannot be had cheaply, which will prevent the entire displacement of finished iron by steel, but the puddler has undoubtedly been struck a more damaging blow than ever before in the localities in which he has hitherto been strongest.

But what of other iron and steel workers, will they be as seriously affected as the puddlers? Certainly not, because they are not threatened with absolute extinction. But manufacturers have now apparently enforced all economies of which they are capable, and as the market still shows no sign of improvement there will be reduction in wages to keep establishments in operation. Annual agreements will, of course, bar such efforts in some branches until they expire by limitation, and sliding scales will make them unnecessary in others, but it seems inevitable that reduction should be made whenever the way is open. Northern pig-iron makers will certainly attempt to resist the efforts of Southern makers to invade their natural territory, now becoming more determined as a reduction of 10 per cent. in Southern wages has been decided upon and the Southern railroads have been asked to cut freight rates to the lowest point possible. It is true that quite a number of Northern furnaces will shut down rather than to engage in a bitter fight for business and encounter trouble with their employees over a reduction in wages, but there are others who will not do so, and they will have to bear the brunt for all. It is difficult to see how the prices of coke and of lake ores can be maintained at their present level. They must give way also. As a matter of fact, Connelsville coke has been selling for some time past at $1.65 to $1.75, at oven, and the opening up of the Mesaba range this year may bring cheaper ore.

This is a gloomy picture to portray at the opening of spring. It is far different from what we had hoped by this time to be able to delineate. Every indication for an improvement in business for the past year has been eagerly seized by us and perhaps enlarged upon too enthusiastically, our wishes having been wholly in the line of a betterment of trade and having thus in a measure governed our thoughts. But it is of no use to fight against what seems to be the inevitable. There is no improvement visible, and so long as we cannot go forward we will continue to go backward. The iron trade is like a pendulum, always in motion, never at rest. It will be the part of wisdom for labor leaders at such a time as this to advise their followers to make the best of the situation. The times are out of joint and some measure of discomfort is to be expected; in fact, cannot be avoided.

The Gold Movement.

The first satisfactory explanation of the renewed gold export movement which we have as yet seen in print comes from the pen of Henry Clews, who deals with the subject in his last weekly letter. During the past 14 months our exports of goods and specie exceeded our imports of like items by $215,000,000. Against that must be set off large sums on account of interest, freights on imports and undervaluations in goods on which the duty is specific. Mr. Clews states that for an average of the last decade about $85,000,000 surplus of exports over imports has sufficed to liquidate these debtor items. He continues:

> There arises from these facts the strongest possible presumption that, since the beginning of 1891, considerably over $100,000,000 of our securities have been returned from Europe; for the credit balance has unquestionably been settled, and there is no other way in which it could have been done except by the return of stocks, bonds, &c. This reflux of our securities dates from the period of the enactment of the silver law, which doubled the Government purchases of silver. It is coincident with an opinion everywhere entertained in European financial circles, and emphasized by the foreign press, that the course of legislation and the bias of popular opinion in this country indicated a grave possibility that our currency system might become subject to a general depreciation of value, which would correspondingly diminish the value of all our securities not made specifically payable in gold. As Europe holds many hundreds of millions of American securities of the very kind that would be subject to such deterioration, it is nothing more than might be expected that our obligations should be returned in extraordinary amounts, and the more so as the New York market has been in a condition to take them without suffering serious reaction.

Unquestionably there is very much force in this argument, but it is weakened by the fact that a very large share of the securities marketed by Europeans were bonds whose interest and principal is payable in gold. We believe that it is a fact that the liquidation on the part of European holders of American securities was largely forced by the necessity to procure funds, and that it was aided largely, too, by the circumstance that the lowering in the interest rate has proceeded more rapidly than it did abroad. Or in other words, the selling price of American investment securities has been such that they do not net returns at all commensurate

with the risk of having capital so far away from home. Since the Baring failure European investors have probably had opportunities to pick up at relatively low prices securities controlled at home, which they knew more about, and, other things being equal, would rather hold.

Still, it remains true, nevertheless, that moneyed men in Europe have strong convictions and regard the free coinage movement in this country with alarm, so far as their American investments are concerned. If the success of that movement were assured heavy selling of American securities would follow, and gold bonds would be included, on the ground that a general depreciation of values would seriously influence them, too. Optimists who are earnest believers in the single standard may still hold that we could prosper in spite of free silver coinage, but more conservative financiers fear that it would seriously cripple us. It seems quite clear that with all our power we could not force the issue single handed.

A mining craze cannot be frowned down if the impression gains headway that lots of money are to be made by those who can get in. Despite the effort to keep the Mesaba range from following in the track of the Gogebic, the excitement seems to be increasing. On one day alone, the 1st of March, articles of incorporation were filed with the Secretary of State of Minnesota by 11 mining companies to operate on the Mesaba range. Their total capitalization was $21,500,000. It is safe to presume that most of these are organized for purely speculative purposes.

In round figures, the production of copper in the United States last year was 282,000,000 pounds, the Lake leading with 114,000,000 pounds, Montana following with 112,000,000 pounds and Arizona with nearly 40,000,000, the balance coming from scattering sources. The imports in ores and metal were nearly 15,000,000 pounds, while the exports were about 120,000,000 pounds, of which a little over 69,000,000 pounds was in bars and ingots, the balance going out as matte. This left a balance of supply for this country of 177,000,000 pounds. To what extent stocks at the beginning of the year and at its close affected the magnitude of the consumption, it is impossible to tell. Some of the leading producers have persistently declined to report their stocks, so that all data published on this point, however loud may be the protestations announcing their accuracy, are merely guess work. The course of prices and the heavy export sales, however, clearly prove that producers have been carrying heavy burdens. Consumption last year must have been enormous, and would grow even more rapidly if it were thoroughly and widely understood how cheap copper manufactures have become. We understand that sheet copper suitable for roofing is selling at only 4 cents advance over the price of ingot, so that it is now within the reach of many who build the better class of public and private structures. As yet copper rolling mills are inclined to conceal carefully the actual prices at which they are selling, a policy the wisdom of which may be questioned. The small buyer is influential in introducing the product for the particular purpose referred to, and if thoroughly aroused to the situation might lend very substantial aid in building up a large business, even if it were only modestly remunerative.

CORRESPONDENCE.

Legislation Affecting the Marine Boiler.

To the Editor: I have read with interest the article under the above caption in your issue of the 3d. There are many sections in the bill now before the Senate which will if they pass the Congress add to the difficulty and expense of boiler making without providing corresponding advantages. I will note a few defects:

To determine the working steam pressure for all marine boilers having cylindrical shell, multiply the steam pressure now allowed by law by 0.70 and you will have the pressure allowed by the bill. For example: Taking a boiler of any given diameter, made in the best possible manner, so as to be allowed the 20 per cent. additional pressure now allowed by law, and now allowed a working pressure of 160 pounds per square inch, and we have $160 \times 0.70 = 112$ pounds., the maximum pressure allowed under the proposed change. This requires a steamer already overloaded with heavy machinery to carry 30 per cent. more weight of boiler to do the present work—this would almost sink some of them.

The bill makes the Supervising Inspector-General (who is not required by law to be, and who is not now, an engineer) the supreme judge in machinery, and from his decisions there can be no appeal.

The main fault to be found with the present law lies not with the law itself, but with a want of obedience to its provisions in appointing the officers to carry it into effect, particularly as to the appointment of supervising inspectors, some of whom are not engineers, as required by a proper reading of the law.

And also in the matter of assistant inspectors. In this matter the present law is not plain, as the only duty required of them in the law is to draw their specified pay, whereas they are, as far as the real inspection of vessels and boilers is concerned, performing all the duty required of local inspectors except to sign certificates, while as the law is now construed the assistant inspector is not required to be an expert in the matters that he decides on. In other words, an irresponsible and in some cases unqualified assistant makes the inspection and decides the case, while the responsible local inspector, who seldom sees the boat or boiler at all, is compelled by law to sign a certificate as to the safety of vessel and boiler which, if any fatal accident occurs, may send him to the State prison for manslaughter.

This should be changed so that assistant inspectors should be appointed in the same manner and have the same duty to perform and the same qualifications as local inspectors, only that they should be directed by the local inspectors what steamers or other places they should visit. B. C.

NEW YORK, March 5, 1892.

The firm of Wickwire Brothers of Cortland, N. Y., manufacturers of wire cloth, has been incorporated, with a capital stock of $300,000.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., March 8, 1892.

Under a decision of the Committee on Ways and Means, the tentative tariff bills, placing wool, binding twine and cotton ties on the free list, were taken up to-day and will be debated for a week or ten days, and will only be set aside for the consideration of appropriation bills reported from time to time.

These bills will be passed by nearly a party vote, but stand very little chance of receiving consideration in the Senate. When they reach that body they will be referred to the Committee on Finance, where they will slumber without an awakening.

The Ordnance Department of the army is now getting its work on the heavy guns well advanced. Those being made under contracts are particularly in a state of forwardness. The contract for 100 guns—namely, 25 8-inch, 50 10-inch and 25 12-inch—with the Bethlehem Company has advanced to the point of completing all the 8 inch forgings. They are now pushing those for the larger calibers. The Midvale Company have also commenced to deliver the forgings under their contract. The West Point Foundry is also assembling 11 8-inch guns, and is also making 30 12 inch mortars of cast iron, hooped with steel.

The Builders' Iron Works at Providence, R. I., have completed 30 more of these mortars of 24 inches. The South Boston Iron Works have also orders for 43 12 inch mortars. The Midvale Company have a Government order for a supply of armor-piercing shot, 218 8 inch, 432 10 inch and 50 12-inch. These shot are very similar to the Holtzer. The Watervliet Gun Factory is now in position to assemble and furnish guns as fast as the forgings are supplied. The great need will now be gun carriages. It is expected that the experimental tests of the pneumatic gun carriage will be finished this week so that the Board may make its final test and report. It was stated in connection with gun carriages that the most important matter was the selection of a type, after that they can be produced in any quantities on short notice, as they could be turned out in any first-class foundry and machine shop. The Army Ordnance Department will now keep pace with the requirements of the seacoast defenses.

Senator Squire, chairman of the Committee on Coast Defenses, has submitted an elaborate and exhaustive report on the bill reported by him last week for the establishment of a gun factory on the Pacific Coast for the assembling of heavy ordnance for the army and navy. The question of the advisability of establishing such a factory has been under consideration by the committee for some months, and several hearings have been given upon the subject.

During these hearings it was apparent that while the War Department officials favored the plant they are strongly opposed to having any of the direction of the factory given to naval officers, on the ground that the coast defenses of the Government were properly in charge of the War Department; and as the factory was intended chiefly to manufacture guns for the protection of the Pacific Coast the army should have complete control of it. The committee, however, by a unanimous vote, decided to report the bill in its present shape, which leaves the control of the factory under the direction of both the War and Navy departments.

Senator Squire in his report says the necessity for a gun factory on the Pacific Coast is manifest, as the saving in the cost

of transportation which would result would more than equalize whatever slight difference there might be in the cost of manufacturing the guns on the Pacific Coast as compared with some Eastern point. There is great doubt, says the report, whether the larger guns, particularly the 16-inch, could be transported by rail acro·s the continent, and the highest authorities question the practicability of such an undertaking. In view of the difference of opinion as to the exact place on the Pacific Coast where the factory should be located, the report continues, the committee are of the opinion that its location should be left to the decision of a board of competent experts, as provided for in the bill. The committee is also of opinion if there be no large establishment of this kind located on the Pacific Coast there will be need of two small shops for repairs, to be located somewhere on Puget Sound and at Benicia. The committee unanimously recommend the passage of the bill.

PERSONAL.

R. H. Johnson, who is well known in the iron trade through his connection with the different wire associations, is now vice-president of the Columbus and Hocking Coal and Iron Co., at Columbus, Ohio.

C. A. Macdonald has sailed for Europe.

Walter H. Carpenter, formerly chemist for the Carpenter Steel Company, at Reading, Pa., has been appointed purchasing agent for that firm.

Considerable notoriety has been given a report to the effect that John Jarrett, U. S. Consul at Birmingham, Eng., had resigned his position and would return to Pittsburgh for the purpose of accepting the position of secretary of the Iron and Steel Sheet Manufacturers' Association, which was organized in Pittsburgh about a month ago. We are authoritatively informed that there is no truth whatever in the report so far as it applies to Mr. Jarrett. It is probable that a secretary will be engaged jointly by the Iron and Steel Sheet Manufacturers' Association and the Tinned-Plate Manufacturers' Association of the United States, but as yet no selection has been made.

Charles E. Tripp, who has been engaged for several years in the railway supply business in Chicago as the Western agent for the French Spring Mfg. Company, has become a partner in the management of the Auditorium Hotel with Messrs. Breslin and Southgate.

A. W. Dreves, Western agent for the Pottsville Iron and Steel Company, has established his office in room 223 Phenix Building, Chicago. His new connection has been made at rather an inauspicious time for the structural business, but it would take something very disastrous indeed to curb his energy.

Professor D. S. Jacobus delivered an illustrated lecture on "Refrigerating Machines" on the 4th inst. before the Brooklyn Institute of Arts and Sciences.

Major C. O. Godfrey left last week for England and Germany in the interest of the Attalla (Ala.) Iron and Steel Company.

The *Manufacturers' Record* of Baltimore has been purchased from the Messrs. Edmonds by a company composed of Walter H. Page of New York, editor of the *Forum*; Edward H. Sanborn of Philadelphia; Thomas P. Grasty, who has been for nearly three years the chief Southern correspondent of the *Record*, and others. Mr. Sanborn will become the new editor of the journal.

The Maximum Pig Production Reached.

The month of March was ushered in with the greatest pig iron production in progress which this country has yet reached, a feat which is mournfully reflected in demoralized markets throughout. The reaction against the tremendous production has, however, already set in, and it is probable that next month will show a reduction.

The weekly product of all the furnaces on March 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
March 1, 1892	305	193,902
February 1	308	187,383
January 1	305	188,082
December 1, 189	298	188,135
November 1	304	187,685
October 1	306	181,615
September 1	299	170,846
August 1	296	169,576
July 1	293	171,115
June 1	258	146,782
May 1	227	115,590
April 1	228	113,483
March 1	257	134,526
February 1	294	146,050
January 1	302	167,509
December 1, 1890	340	183,846
November 1	342	177,958
October 1	336	179,263
September 1	323	171,776
August 1	324	164,798
July 1	336	175,727
June 1	345	180,791
May 1	344	180,099
April 1	344	178,474
March 1	343	180,991
February 1	334	173,651
January 1	333	174,038
December 1, 1889	328	169,151
November 1	323	165,225
October 1	311	151,057
September 1	294	134,068
August 1	286	145,899
July 1	285	141,419

The anthracite capacity working was as follows:

Anthracite Furnaces, March 1, 1892.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York	19	7	3, 34	12	4,648
New Jersey	12	4	1885	8	2,240
Spiegel	3	3	216	0	0
Pennsylvania:					
Lehigh Valley	47	29	11,043	18	5,606
Spiegel	1	0	0	1	56
Schuylkill Valley	31	18	8,892	13	4,730
U. Susquehanna Valley	16	8	2,877	8	2,022
L. Susquehanna Valley	16	8	4,053	8	2,657
Spiegel	1	1	4 8	0	0
Lebanon Valley	15	11	6,770	4	876
Totals	161	89	38,678	72	22,835

For a number of months past our records show the following:

	Furnaces in blast.	Capacity per week.
March 1, 1892	89	38,678
February 1,	9?	38,124
January 1	94	38,307
December 1, 1891	85	34,905
November 1	87	33,802
October 1	85	32,459
September 1	82	31,214
August 1	88	32,860
July 1	92	37,892
June 1	91	36,561
May 1	90	35,331
April 1	91	36,598
March 1	93	38,543
February 1	95	40,212
January 1	101	43,166
December 1, 1890	105	43,474
November 1	104	42,141
October 1	100	38,027
September 1	104	39,115
August 1	106	41,013
July 1	112	42,543
June 1	117	45,142
May 1	124	46,912
April 1	119	46,110
March 1	115	45,790

The principal increase in the capacity among the anthracite furnaces has taken place in New Jersey, where one of the Andover furnaces has started, and where Secaucus blew in on the 15th ult. The Lehigh Valley has declined in product through the stoppage of No. 2 Glendon for repairs and of No. 1 Lehigh. In the Upper Susquehanna Valley Marshall banked on February 20 for 60 days.

The grouping of the blast furnaces by States has led to one conspicuously abnormal result which distorts, statistically, the relations of different sections of the country as pig-iron producers. It has been the custom with some statisticians to place the product of West Virginia with the Southern group, when every consideration points to a different course. With one exception the West Virginia furnaces are as distinctively a part of the Northern group as the plants in the Mahoning or Shenango Valleys, or in the Pittsburgh district. They draw their raw materials from the same sources, and make the like product. Through the fact that some of the plants in the district which has as distinct and well defined an entity as those named, happen to be located on the other bank of the Ohio River, facing their West Virginia rivals, a part of the product is reported as Southern, and the other part is grouped with scattered concerns in Ohio. Since the Wheeling district is commercially a unit of great influence, we have decided to present the figures relating to it as such. We have included in it the Bellaire, Belmont, Benwood, Jefferson, Mingo, Riverside, Steubenville and Wheeling furnaces.

On the 1st of this month, the position of the coke furnaces was as follows:

Coke Furnaces, March 1, 1892.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York	6	4	4,223	2	1,506
Pennsylvania:					
Pittsburgh district	25	24	34,127	1	1,125
Spiegel	1	1	1 458	0	0
Shenango Valley	17	14	11.836	3	2,148
Juniata and Conemaugh Valley	17	10	7,149	7	2,625
Spiegel	1	1	579	0	0
Youghiogheny Val	3	1	1,042	2	1,500
Miscellaneous	4	1	682	3	1,678
Maryland	5	1	1,400	4	4,470
West Virginia	1	0	0	1	250
Wheeling District	9	8	8,753	1	1,380
Ohio:					
Mahoning Valley	15	10	10,211	5	3,861
Central & Northern	11	9	6,927	2	1,386
Hocking Valley	14	3	1,243	11	2,667
Hanging Rock	15	7	1,615	8	1,870
Indiana	2	1	208	1	180
Illinois	19	13	18,991	6	6,660
Minnesota	1	1	746	0	0
Wisconsin	4	2	1,881	2	1,500
Missouri	6	1	560	5	2,760
Colorado	3	0	0	3	1,700
The South:					
Virginia	18	13	7,072	5	2,853
Kentucky	4	3	1,640	1	310
Alabama	37	25	16,382	12	6,480
Tennessee	12	9	4,050	3	1,480
Georgia	2	0	0	2	1,045
North Carolina	1	1	125	0	0
Totals	253	163	143,490	90	51,436

As compared with previous months, the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
March 1, 1892	163	143,490
February 1	167	138,268
January 1	163	138,611
December 1, 1891	162	142,747
November 1	162	142,152
October 1	163	135,997
September 1	161	127,664
August 1	154	125,736
July 1	150	122,422
June 1	124	100,165
May 1	98	70,529
April 1	90	67,570
March 1	113	85,093
February 1	125	94,473
January 1	143	112,15
December 1, 1890	168	127,63
November 1	168	122,55
October 1	170	127,24
September 1	156	119,75
August 1	150	113,04
July 1	163	120,67
June 1	167	123,34
May 1	169	122,48
April 1	173	121,56
March 1	169	122,59

February 1	169	118,568
January 1	169	119,396
December 1, 1889	162	116,319
November 1	160	112,269
October 1	154	102,454
September 1	141	96,744

The most striking fact in connection with these figures is that while the number of furnaces in blast has decreased, the capacity of those blowing has been heavier. This is primarily due to the fact that some of the larger furnaces in the Pittsburgh district, which were out for repairs, have resumed, notably one Edgar Thomson, one Lucy and one Edith, leaving Soho as the only stack now idle. It is extraordinary that in the most gloomy period in the iron trade for years Pittsburgh runs practically in full blast, and, what is more, is contemplating very important accessions to plant The Carnegies, as already announced in *The Iron Age*, are preparing to equip their Duquesne mill with two or three modern furnaces, so that they can make their billets direct, in one heat from the ore; and now comes the announcement that the Monongahela Furnace plant of two furnaces, which was originally laid out with the view of doubling it, making four. The owners of the works, the National Tube Works Company, are the largest makers of tubes and pipes in the world. It is understood that they are convinced that steel must become the metal for their product, which is now entirely made of iron. In preparing for this change they will probably put up the two additional blast furnaces and build a large Bessemer plant.

Referring again to our report, we may note that while Ella in the Shenango Valley banked during the month, and Douglass has since done the same, the plant of the Cambria Company is making so heavy a product that we have considerably increased the rating of its district. While Maryland has blown out one furnace and the Illinois Steel Company have stopped one Union, the Mohawk has started in New York and the Cleveland Iron Company have blown in one stack. The Mahoning Valley stands with the same record, but it must be noted that Anna is to blow out on the 10th because of the unprofitable character of the pig-iron business. Winona, in the Hocking Valley, a small stack, has stopped. In the South, one of the Ensley furnaces of the Tennessee Company, one Dayton in Tennessee and Rising Fawn in Georgia have gone out of blast. The only announcement of the early resumption of work comes from the South. In Virginia, Big Stone Gap, a new plant, is to make its first cast in a few weeks. In Tennessee, Embreville, a new and well-equipped plant, is to start at an early date. Concerning the other furnaces building or completed in the South, it may be stated that they are unlikely to figure as producers in the immediate future.

It may be interesting, in connection with the large product being made, to note how large a proportion is turned out by steel companies. Reports of the output for February of the Illinois Steel Company, the Carnegie associations, Troy, Bethlehem, Cambria, Maryland Steel Company, Pennsylvania Steel Company, Cleveland Rolling Mill Company, Pottstown, Wellman, Lackawanna, Bellaire and Riverside, show a total product of 252,524 gross tons. It is fair to state, therefore, that considering the absence of two concerns from this total, and noting that at least one large works produces some foundry iron, 250,000 gross tons of pig iron are produced by steel works, or roughly 60,000 tons a week of Bessemer iron out of the 180,000 tons of anthracite and coke pig made does not reach the open market. Besides this, of course, there is a large quantity of forge iron which is consumed in puddling furnaces of mills to which the blast furnaces are attached. In the majority of cases these plants will be run to full capacity in dull times, so that a shrinkage in the demand for Bessemer and forge iron falls upon the outside producers, and the concentration of business in the hands of large rolling mills, which is a natural result of the change from iron to steel, will continue to exert an increasing pressure upon those concerns who are makers of pig iron pure and simple, particularly when they draw their raw materials from the same sources, as is the case notably in the districts using Lake ores and Connellsville coke.

The following table relates to the charcoal capacity:

Charcoal Furnaces, March 1, 1892.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England	14	6	470	8	560
New York	6	3	375	3	240
Pennsylvania	13	4	210	9	790
Maryland	7	1	134	6	602
Virginia	13	1	40	12	820
Ohio	9	3	285	6	538
Kentucky	3	1	400	2	535
Tennessee	7	4	1,010	3	382
Georgia	3	0	0	3	660
Alabama	13	8	1,903	5	1,150
Michigan	30	10	3,710	19	2,609
Missouri	2	2	627	0	0
Wisconsin	5	4	1,885	1	90
Texas	4	2	460	2	428
California	1	0	0	1	120
Washington	1	0	0	1	170
Oregon	1	1	225	0	0
Totals	122	50	11,734	72	9,704

As compared with previous months, the record stands as follows:

	Furnaces in blast.	Capacity per week.
March 1, 1892	50	11,734
February 1	49	10,991
January 1	48	11,164
December 1, 1891	52	11,033
November 1	55	11,731
October 1	58	13,159
September 1	56	11,968
August 1	54	10,980
July 1	50	10,801
June 1	44	10,056
May 1	39	9,730
April 1	41	9,295
March 1	51	10,890
February 1	56	11,365
January 1	59	12,280
December 1, 1890	67	12,738
November 1	70	13,262
October 1	66	13,389
September 1	63	12,904
August 1	59	10,745
July 1	61	12,511
June 1	61	12,312
May 1	52	10,698
April 1	52	10,804
March 1	59	12,606
February 1	58	11,378
January 1	59	11,485
December 1, 1889	66	12,779
November 1	67	12,293
October 1	63	12,047
September 1	60	11,327

There have blown in during February Old Alcalde in Texas, Mt. Vernon in Onio, and Napier, the new furnace, in Tennessee. There were stopped Muirkirk in Maryland and Jenifer in Alabama.

During the month just closed stocks of coke iron have increased largely, with the result that probably more iron is being carried to-day by the coke pig-iron producers than at any previous time. Our returns show 452,996 tons in the yards of 124 furnaces, 102 of which are active, and whose aggregate weekly capacity is 97,590 tons. Compared with our report on the 1st of February, this shows an increase in stocks of 42,284 tons. This increase is generally scattered thoughout the country and is not confined to any one particular district more than another.

The stock of charcoal iron remains about the same as on the 1st of February, 164,105 tons being carried by 27 active and 16 idle furnaces whose weekly capacity is 11,176 tons, as compared with 173,797 tons and 50 furnaces February 1. The same is true of the anthracite producers, who report stocks of 130,220 tons, held by 54 furnaces capable of producing at the rate of 23,851 tons a week, as compared with 132,544 tons reported by 56 furnaces on the 1st of last month.

MANUFACTURING.

Iron and Steel.

Judge J. A. Wilder of Fort Payne, Ala., has left for Boston in the interest of the Fort Payne Rolling Mill. He hopes to sell the bonds or form a new company that will put the plant in operation. R. W. Gordon, vice-president of the Fort Wayne Furnace Company, left at the same time on a similar errand for his company, and it is his hope to secure sufficient funds to enable them to resume operations. W. P. Rice has been in the North in consultation with the stockholders of the Coal and Iron Company regarding proxies for the special meeting called for March 23.

A general movement has been started by the furnace operators in the Birmingham, Ala., district to reduce the wages of the furnace and coke laborers 10 per cent. The Woodward Iron Company and the DeBardeleben Coal and Iron Company have already put this reduction into effect and it is expected that other large companies will do so soon. The cause of this reduction is the continued low price of iron. The wages of the miners remain unchanged and will probably not be reduced.

The employees of the press shops of the Homestead Steel Works of Carnegie, Phipps & Co., Limited, at Homestead, Pa., have been granted an increase in wages, which went into effect on Wednesday, the 2d inst. The increase amounts to about 13 per cent.

Riter & Conley of Pittsburgh have received a contract from F. B. Baird for all the iron work of a blast furnace to be erected at Buffalo, N. Y., on the site of the old Union Iron Works. The contract includes the furnace proper, which is 80 x 18 feet, three Cowper hot-blast stoves, 70 x 18, with Kennedy hexagon brick, large gas washer and dust catches, smoke stack 10 feet in diameter and 140 feet high, blast pipes, &c. The old Union Iron Works mill will be utilized as a stock house and the cast house will be constructed from some of the other buildings which will be demolished. Three blowing engines belonging to the old plant will be used. The furnace is expected to be completed in about four months from the time operations are commenced.

In the courts at Pittsburgh last week, an affidavit of defense was filed in behalf of the defendants in the case of Riter & Conley of Pittsburgh against W. A. Malaney. The affidavit sets forth that Mr. Malaney is foreman and superintendent of the construction of iron bridges, and for many years did work for Riter & Conley and asked several weeks ago for a settlement of $15,000 on outstanding accounts. He informed them that a failure to settle promptly would cause him to place the matter in an attorney's hands. They agreed to settle, but at the time to settle a hitch occurred and he was summoned to appear to answer a suit brought by the firm to recover money due them amounting to $7000. The answer that was filed claims the firm in the suit gave him no credit for the amount due him, and a certified verdict of $15,000 is asked against Riter & Conley. In order to secure this Attorney Sullivan has entered liens against Carnegie, Phipps & Co., reputed owners of a building at Munhall, for $4039; also against the Oil Well Supply Company for structural work on the Continental Tube Works for a balance of $1663.45; against the Lewis Foundry Company for $1000.45; against Jones & Laughlins for $7079, and one against the Pennsylvania Tube Works for $232.56. In all of these Riter & Conley were the contractors, and their buildings were erected by Mr. Malaney.

The Springfield Iron Company of Springfield, Ill., are increasing their capacity for the production of track bolts. Additional machines have been added, and the company will shortly be in a position to turn out at least 50 per cent. more than hitherto.

No. 5 sheet mill, the last of the new sheet mills recently erected by the Ætna Iron and Steel Company at Bridgeport, Ohio, was put in operation last week. All departments of the plant of this firm are in full operation.

M. V. Smith, metallurgical engineer, of Pittsburgh, has recently furnished the plans and specifications for a new rolling mill and nail factory now being erected at Chihuahua, Mexico, by the Compania Industrial Mexicana. Thos. Fletcher, president

of the company, has been in Pittsburgh for several weeks past for the purpose of engaging skilled labor to operate the plant. It is expected that operations will be commenced as soon as the rolls are received, which are being built by the A. Garrison Foundry Company of Pittsburgh, Pa.

A meeting of the stockholders of the Birmingham Iron and Steel Company of Pittsburgh will be held in that city this week to vote for or against an increase in the capital stock.

Notices were issued last week by Pierce, Kelly & Co., proprietors of the Douglass furnaces at Sharpsville, Pa., stating that they were at work on their books, and requesting a meeting of creditors at their office in Sharpsville on Wednesday, March 9, when they expect to be able to present a statement showing their financial condition If the showing is favorable, it is probable that an extension will be granted the firm.

N. E. Ayer & Co. will establish a rolling mill at Portland, Ore., for the manufacture of merchant bar iron. Work will begin at once, and it is expected that the plant will be in operation, employing 100 hands, by July next.

Sandusky, Ohio, is endeavoring to raise $150,000 for the purpose of inducing an Eastern concern, known as the Aluminum Steel and Alloy Company, to locate a plant at that city.

It is reported that Philadelphia parties are negotiating for the purchase of the Powelton furnaces at Saxton, Pa. The sale of the property is advertised to take place this week, but it is said to be the object of the prospective purchaser to forestall this sale by buying in advance the first mortgage against the property, which amounts to $350,000. There is a second mortgage for a like amount against the property. The plant has been idle for two years, owing to the litigation in which the affairs of R. Hare Powel & Co. are involved.

It is said that the Charlotte Furnace at Scottdale, Pa., will shortly pass into the hands of Pittsburgh parties.

Cambridge, Ohio, it is said, offers a bonus of $25,000 for a rolling mill.

Joanna Furnace in Berks County, Pa., will resume operations early in the spring.

At a recent meeting of the stockholders of the Decatur Land Improvement and Furnace Company of Decatur, Ala., a plan was adopted for the reorganization of the company, which will discharge the entire indebtedness of the company and provide a working capital of $75,000.

The Warwick Iron Company of Pottstown, Pa., will make application for a new charter.

The work of repairing the Cedar Point Furnace, at Port Henry, N. Y., is progressing rapidly, and it is expected to have the furnace ready for operations by April 1.

A strike has occurred at the wire mills of the Washburn & Moen Mfg. Company., at Worcester, Mass., some 75 men being out. The trouble originated in the refusal of one of the men to teach a girl a part of the work. In this action the workman was supported by his fellow workmen, with the result that the men went out. The men regard the introduction of women as an effort on the part of the firm to get certain parts of the work done cheaper than it is at present. No settlement has yet been reached.

The Fairchance Furnace, at Fairchance, Pa., is being torn town. It was built in 1887, and had not been operated for the past two years.

Jenifer Furnace, at Jenifer, Ala., has blown out to make improvements with a view to increasing the output.

Douglas Furnace, at Sharpsville, Pa., has been banked pending an investigation into the affairs of Pierce, Kelly & Co.

Abram Reese of Pittsburgh, Pa., has on exhibition at the office of Samuel W. Hay, room 512, Hamilton Building, in that city, a working model of a new three-high universal rolling mill that, it is claimed, rolls the bars edge and flat, both passes, without reversing the engine. The following advantages are claimed for this mill over the ordinary reversing mill: Cost not over one-half; capacity increased from 50 to 100 per cent.; maintenance cost not over one-fifth of regular universal mill; all vertical rolls as well as the side guides are set up by one motion, instead of eight, as is the practice on a universal mill. It is further claimed that this mill can be operated by a regular bar mill crew on all kinds of squares and flats without lifting tables, making from 3-16 inch thick up to 8 inches thick, and 2 inches wide to 36 inches wide. Also all squares from 2 inches up to 8 inches without change of rolls. A number of persons prominently identified with rolling mill practice have examined the mill and speak in very high terms of it.

Some extensive improvements are being made at the Lucy furnaces of Carnegie, Phipps & Co., Limited, at Pittsburgh. A new wrought-iron stock house, 210 x 50 feet, will be erected by the Keystone Bridge Company. The tracks, buildings and trestles are also being repaired.

The Lackawanna Iron and Steel Company are completing extensive improvements in the finishing department of the Scranton Steel Company, acquired last year.

Machinery.

The Schenectady Locomotive Works, Schenectady, N.Y., have awarded John McDermott, of that city, the contract to build for them a capacious new foundry. The new building will be 346 feet long and 100 feet wide, and will be located on the east side of Romeyn street.

The Faber Machinery Supply Company of Pittsburgh have issued their first monthly bulletin, containing a descriptive list of the second-hand machinery they have for sale.

The Union Iron Works and Shipbuilding Company of San Francisco have acquired the Pacific Iron Works, with its large and complete plant.

The machine shops of the Savannah, Florida and Western Railway Company, Savannah, Ga., were damaged last week to the extent of $10,000 or $15,000 by the explosion of the boilers.

The shops of the Elliston Mfg. Company, Elliston, Va., which were recently destroyed by fire, will be rebuilt at once.

The Goulds Mfg. Company of Seneca Falls, N.Y., have just shipped a triplex pump weighing nearly 8 tons. The pump is the second of this style built by the company, is intended for special work, finished in style and almost noiseless in operation.

H. H. Lane, proprietor of the large foundry and machine shop at Huntingdon, Pa., has made an assignment to Thos. S. Johnston The liabilities are given at $12,000, with assets of $8000. Dullness of trade is given as the cause of the assignment.

The Pittsburgh office of the Babcock & Wilcox Boiler Company located in the Lewis Block, Pittsburgh, Pa., have a large number of contracts on hand, and have just equipped the Edgar Thomson Steel Works of Carnegie Bros. & Co., Limited, at Bessemer, Pa., with 2000 horse-power Babcock & Wilcox water-tube boilers fitted with Roney stokers and with special facilities for the removal of ashes. The boiler house is complete in every particular. The same firm have also fitted up 150 horse-power boilers at the light locomotive works of H. K. Porter & Co., located in Pittsburgh. This is the third locomotive works now using Babcock & Wilcox boilers, the other two being the Baldwin Locomotive Works of Philadelphia, and the Schenectady Locomotive Works of Schenectady, N. Y.

The Moore Mfg. and Foundry Company of Milwaukee, Wis., have discontinued the manufacture of hoisting engines, owing to the pressure of other branches of their business. They offer for sale at low prices five engines now on hand, and are desirous of disposing of the patterns for making three sizes. This is an excellent opportunity for some manufacturer who desires to engage in this line.

The Marinette Iron Works Company of West Duluth, Minn., are taking time by the forelock in making preparations to undertake the manufacture of blowing engines for blast furnaces. They have all the facilities needed in handling heavy work, and have a high reputation for the machinery they have turned out. Some time since mention was made of the fact that they had received a contract for a triple-expansion engine for the American Steam Barge Company of West Superior. They have also furnished a triple-expansion engine of high power to a Duluth flour mill. If the furnaces now projected at Duluth should be built, this company will be in a favorable position to execute contracts for the blowing machinery.

A new corporation, known as the Finch Mfg. Company, and composed of local capitalists, have made arrangements to purchase the plant of I. A. Finch & Co., at Scranton, Pa. The new concern has a capital stock of $400,000. The foundry plant, which now embraces a tract 450 x 250 feet, will be considerably enlarged and improved.

The Bates Machine Company of Joliet, Ill., are crowded with work at present, reporting their special business so good that they have found more trouble in shipping machinery on time than getting orders for it. They have recently been turning out quite a number of their improved Bates-Corliss engines, which are giving good satisfaction. They have an engine now at work in the H. P. Nail Company's plant at Cleveland of nominally 700 horse-power, which is developing over 1700 horse-power. It has a 60,000-pound wheel and makes 90 revolutions. The company are furnishing complete wire-mill outfits, including engines, shafting, blocks, annealing furnaces, galvanizing pans, barb-wire machines, nail-barbing machines, wire-nail tumblers, staple machines, &c. The enlargement of the Lambert & Bishop works and the new plant of the Enterprise were mainly their work.

The Noble Bros. Company, capitalized at $25,000, have been incorporated to operate the Murray & Stevenson foundry and machine shops, at Anniston, Ala., the same having been purchased by the company.

The Comins Mfg. Company have been organized at Columbus, Ohio, with a cash capital of $25,000. The company will occupy the old Stevenson Foundry, and engage in the manufacture of engines and boilers, and other mechanical appliances.

H. H. Lane, foundryman and machinist, at Huntingdon, Pa., has made an assignment for the benefit of creditors. The liabilities are placed at $10,000, and the assets are thought to be about the same.

Wm. Tod & Co., founders and machinists, of Youngstown, Ohio, received last week an order from Carnegie, Phipps & Co., Limited, at Pittsburgh for a 2300 horse-power engine. This will make 22 engines that Wm. Tod & Co. have furnished to the above firm in the past four years.

The Schenectady Locomotive Works of Schenectady, N. Y., have let a contract for a new foundry, 346 x 100 feet in size, work on which will begin at once.

The Raymond & Campbell Mfg. Company, capitalized at $350,000, have been chartered at Middletown, Pa., for the purpose of manufacturing boilers, general machinery, stoves, &c.

A. R. Whitney & Co., 29 Broadway, New York, have just shipped ten of their wire nail machines to Warrington, England, where one of their machines has been on trial for a year in competition with those of English make. The company also have an application for the same machines from Belgium.

The Fitchburg Steam Engine Company of Fitchburg, Mass., are now occupying their new shop. The capacity of the company is now about three times greater than formerly.

Detroit Foundry Equipment Company, Detroit, Mich., have recently shipped a large order to Brazil, South America, consisting of improved power cranes and general foundry equipment. This company now manufacture a full line of cranes of all kinds, giving especial attention to power and electric cranes of the latest improved patterns.

L. Schutte & Co., machinists and engineers, have broken ground for a new building at Twelfth and Thompson streets, Philadelphia. The structure is to be built in the most substantial manner of granite, terra cotta and iron. The dimensions of the building will be 80 x 83, five stories with basement, and tower, two stories, 20 feet square, making seven stories in all. The building when completed is expected to be an ornament to the neighborhood, besides being one of the most conveniently arranged establishments of the kind in the city.

Hardware.

Ludlow-Saylor Wire Company, St. Louis, Mo., a few days since were asked to bid on an elevator inclosure for five floors, for the Baldwin Theater at Springfield, Mo., and name the earliest moment the same could be delivered. Their bid was accepted, and the inclosure was ready for delivery to the railroad company within 20 working hours, which was 10 hours better than was promised. This illustrates the advantages possessed by this concern, which they derive from having in their plant the latest improved machinery, thus enabling them to turn out work at the shortest possible notice.

The Columbia Mfg. Company, organized under the laws of Maine, with a capital stock of $150,000, will manufacture nozzles and wrenches at Brockton, Mass.

The Nubian Iron Enamel Company, 33 to 35 Nubian avenue, Cragin, Ill., and 77 Warren street, New York, report that for the first two months of 1892 their trade has been most excellent in their entire line. The demand from manufacturers of agricultural implements is especially referred to.

The capital stock of the Morris Hardware Company of Youngstown, Ohio, has been increased from $100,000 to $200,000.

The Bellaire Stamping Company of Harvey, Cook County, Ill., have been incorporated under the laws of Illinois, with a capital stock of $285,000, to engage in the manufacture of enameled ware, tinware, lamps, &c. The incorporators are A. P. Tallman, A. O. Mellott and others. The factory of this company, at Harvey, is fast approaching completion. The buildings have been erected, and the machinery is now in process of installation. It will

be a very large and well appointed plant. The main building is a huge three-story brick structure, so well furnished with windows that it almost appears to be made of glass. It will therefore be unusually well lighted. A number of one-story brick wings run out from the main building. These will be used for engine and boiler houses, kilns, drying houses, &c A spur track from the Grand Trunk Railroad runs along the whole front of the building, which has been pierced with numerous doors to facilitate the loading and unloading of several cars at a time. Connections are also easily made with the other roads in the Chicago system. The first floor of the building and a platform along the front are on a level with the floor of a car, contributing to the ease and comfort of the shipping force. It is expected to have the factory in operation some time in April.

Van Wagoner & Williams Company, New York, expect by May 1 to have their entire manufacturing plant removed to Cleveland, Ohio, where, with enlarged and improved facilities, they will carry on their manufacturing business. They will also move their New York offices to 14 Warren street, at which place they will carry a complete stock of their goods.

H. R. Ives & Co., Montreal, Quebec, are about starting up their hardware and stove works at Longueuil, which have been shut down since the winter set in.

The Wells Rustless Iron Company of this city, whose works are located at Little Ferry, N. J., have resumed active operations, and are now prepared to furnish their superior brand of rustless iron pipe, and to do oxidizing for their customers as heretofore. They are also offering a new line of rustless pipe under the trade-mark of Oxide Steel Pipe, which is made of steel, and is claimed to be absolutely free from cinder and dirt. The metal is homogeneous, and free from spots, therefore will cut and thread easily. They guarantee that the inside of the Oxide Steel Pipe is coated with a continuous coating of rustless oxide, and that it will not fill up with rust when used for conveying pure water, neither will it impart any taste to the water. At a recent meeting Charles S. Stephens, who is well known as the Eastern representative of the Riverside Iron Works of Wheeling, W. Va., was elected a trustee in the place of Mr. Charles L. Merritt. Mr. Stephens was also elected secretary of the company. W. T. Wells retains his position as president and general manager.

Miscellaneous.

In a circular to the trade Jacob Hoffmann Wagon Company, Cleveland, Ohio, announce the partial destruction of their factory by fire on the morning of the 27th ult. They state that they have made arrangements to turn out work in their present plant and in temporary buildings and expect to be running to their full capacity in a few days. Work on their new buildings will be started at once and these will be erected with a view to meeting the constantly increasing trade of the company.

Jerome Twichell & Co., manufacturers of corrugated iron, at Kansas City, have been succeeded by the Kansas City Metal Roofing and Corrugating Company, incorporated with a capital stock of $20,000.

The Chicago Insulated Wire Company have been incorporated at Charles City, Iowa, with a capital of $300,000.

At West Bay City, Mich., 400 men employed in the steel department of W. F. Wheeler & Co.'s shipyard went on strike, because of the discharge of one of their number. The company declare their right to hire and discharge as they see fit, and the strike promises to be a protracted one.

The Holmes Fibre-Graphite Mfg. Company, with a capital of $10,000,000, divided into 100,000 shares of full paid, non assessable stock, at a par value of $100 each, is about to be established in Philadelphia.

On March 4 the Gadsden (Ala.) Pipe Works made their first run of soil pipe. The pipe was cast in 5-foot lengths, 4 inches in diameter, and was a perfect success. They used iron made entirely from local ore.

The Art Novelty Mfg. Company, recently incorporated at New Brighton, Pa., with a capital stock of $20,000, commenced operations last week.

Stein & Schwarz, Philadelphia, have closed a contract with the Standard Coal Company of Brookwood, Ala., to build for them a complete coal washing and separating plant.

The Union Forge and Gun Company have been incorporated at San Francisco, Cal., with a capital stock of $2,000,000, of which $535,000 has been paid in, for the purpose of manufacturing guns, plates, armor, shot, shells and forgings.

TRADE REPORT.

Interest centers in the Pig Iron markets of the country, which are rapidly approaching a serious crisis. Our monthly blast furnace statistics show that we entered the month with the largest capacity at work on record, the total being over 193,000 tons per week. It should be noted, however, that there has been some closing down since the first, but as yet far from enough to check the piling up of stocks, which is going on very rapidly. Thus far exceptionally cheap money has helped producers to carry, but any change in the financial situation might cause a good deal of unloading. Reports of low prices come from every section. For prompt delivery and cash Bessemer Iron is available at Pittsburgh at $14.50, and it is interesting to note that Lebanon Valley Iron has been sold in that section, where it is well adapted for mixtures. Southern Iron has sold at low figures in Cincinnati and in Detroit. In the latter place about 20,000 tons has been marketed, 10,000 tons of which was certainly sold on the basis of $9 for Gray Forge at furnace, Birmingham, for delivery during the second half of the current year. It is hinted that this extraordinary sale has been made for effect. In the East the most important point is the indication that the Thomas Iron Company will sharply reduce their price. The negotiations for the fusion of the three largest Southern furnace companies, the Tennessee, Sloss and De Bardeleben, are not yet concluded. These companies make upward of 600,000 tons of Pig Iron annually, and use 13,000 tons of Coal daily, and under one management would wield a tremendous power in all markets.

In Billets, Pittsburgh has touched lowest water mark with a sale of 10,000 tons at $22.75. From different quarters come indications that at least one very large speculative deal is on the tapis. Last week a grave error crept into our report, the statement having been made that cost of converting Bessemer Pig into 4 x 4 inch Billets is $6 and $8 for 2 x 2 inch. The figures should have been $8 and $10, respectively. We are credibly informed that $7.50 is the lowest notch on the former and that probably only one mill can turn out the 2 x 2 for $9. In sympathy with Billets, Wire Rods are weaker, although the reports in the Wire trade indicate a heavier movement. Our Pittsburgh correspondent reports a low sale of Muck Bar, and greater interest in this branch is also shown in Philadelphia.

In the Steel-Rail trade Pittsburgh records a sale of 16,000 tons, while the Eastern mills figure up only 6000 tons.

There has been some movement in Beams in Chicago, where a very large amount of Structural work is sure to come into the market. Eastern bridge concerns have taken quite a number of good orders in the West and South, and Eastern Plate makers continue to capture the lion's share of the Western trade. Iron and Steel Bars and Shapes are pretty weak in all sections..

In the Metal trade the rumors of negotiations among the leading Lake Superior and Montana producers to restrict the output constitutes the principal item of interest. There is some talk also of a consolidation among the Brass and Copper mills, who have been competing very sharply of late.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., March 8, 1892.

The course of events during the past week has not been encouraging to the Iron trade, although there is a growing belief that things are in such a position that any change at all must be for the better. At the moment, the feeling among buyers is one of absolute indifference, and as a rule low prices are no inducement to any one not actually in need of material, although there have been one or two instances in which Iron has been sold to pay advances, and for which fairly good figures were realized, considering the nature of the transaction. Generally speaking however, consumers are inclined to hold off, and while it cannot be said that prices are any better, yet there are some signs of the market steadying itself, and it might not require unusually heavy buying to impart some degree of strength at the low figures which are now pretty generally established. Nevertheless, there is not enough doing to warrant very positive statements on this subject, and a good deal will depend on developements during the next 30 days. There are two favorable features however, one being the disposition to curtail production, the other that consumers are not carrying much stock, and are therefore likely to be continuous buyers, unless things are in a worse condition than any one is prepared to believe But a slow and hesitating business is about all that seems probable for the near future, although, as we said before, there appears to be very little margin for a further decline.

Pig Iron.—This branch of the Iron trade is exceedingly hard to report. Buyers are unwilling to make bids for anything not actually required, so that holders have no alternative but to meet such demand as there is, and take their chances for a larger business later on. Some of the favorite brands are moderately well taken up, but of one kind or another there is plenty of Iron, and in many cases it needs only a firm offer to get it at surprisingly low figures. On such a market it is impossible to quote prices satisfactorily, although there is no material change from the rates quoted a week ago, but everything depends on circumstances, such as quantity, brand, delivery and the necessity of the holder to realize. Some of the best local brands of Gray Forge have been sold in good-sized lots at $14, at furnace, others, claimed to be equally good but not usually recognized as such, at $13.50 @ $13.75. Southern Irons have been sold in Baltimore at a little less than $15 for No. 2x, and less than $16 for No. 1x, with some lots offered at still lower figures, and, as a matter of fact, it is not so much a question of price as to find some one who can take a round lot, and within reasonable limits name their own figures. General quotations for Philadelphia and near-by deliveries are about as follows, with the usual concessions at such points as Baltimore, Harrisburg or York, where freights are in buyers' favor:

American Scotch, No. 1x	$17.50	@	$18.00
American Scotch, No. 2x	17.00	@	.....
Standard Penna (Lake Ore), No. 1x	17.00	@	17 50
Standard Penna. (Lake Ore), No. 2x	15.50	@	16.00
Standard Penna. (Lake Ore), No. 2 plain	14.50	@	15.00
Lehigh and Schuylkill, No. 1x	16.50	@	16.75
Lehigh and Schuylkill, No. 2x	15.00	@	15.50
Standard Virginia, No. 1x	16.00	@	16.50
Standard Virginia, No. 2x	15.00	@	15.25
Medium Va. and Southern, No. 1x	15.75	@	16.00
Medium Va. and Southern, No. 2x	14.50	@	15.00
Standard Penna. and Virginia Forge	14.25	@	15 00
Ordinary Forge Cinder mixed	13.50	@	13.75
Hot-Blast Charcoal	18.50	@	21.00
Cold-Blast Charcoal	24.00	@	26.00

Postscript.—It is reported this p.m. that one or more of the leading Lehigh com-

panies will, within the next 24 hours, announce a reduction of from $1 to $1.50 ₱ tor, awaiting which negotiations are all in abeyance.

Charcoal Iron.—Lots aggregating upward of 2000 tons of Alabama Irons have been placed at prices varying from $18 to $18.50, delivered to consumers near by. These were sold to cover bankers' advances, and, considering the circumstances, are not unusually low figures, although very much below what the owners expected to realize.

Muck Bar.—Quite a good business has been done compared with the amount during the past two or three months. Two or three sales of several hundred tons each have been made at a little over $25, and $25.25 delivered to consumers in the immediate vicinity, and orders for at least 1000 to 1500 tons more could be had at $24.75 @ $25, but makers stand out for over $25.

Steel Billets.—Some business has been done during the week, but without improvement in prices. Makers are badly in need of orders, and while they talk $25.25 @ $25.50 for deliveries at Philadelphia or near-by points, it is not unlikely that bids at less money would meet acceptance. But consumers are not bidding for anything they don't want, so that in the meantime prices are nominal at $25.25 @ $25.50 seaboard, or $25 @ $25.25 Susquehanna Valley, price according to quantity and time and point of delivery.

Steel Rails.—Demand still confined to small lots, with the exception of one sale of 20,000 tons by the Lackawanna Company for delivery to the Huntingdon system of roads, Gulf Coast and South. Prices unchanged at $30, f.o.b. cars at mills.

Bar Iron.—As a rule business is dull and disappointing, but several of the mills that have a reputation for quality say they manage to run moderately full at 1.70¢ @ 1.75¢ for city deliveries. For medium qualities, however, there is comparatively little demand, and it is harder to sell makes that are not wanted at 10¢ @ 15¢ less than such as above named at relatively high figures. At interior points 1.60¢ @ 1.70¢, at mills, cover both extremes, and for the city 1.70¢ @ 1.75¢.

Plates.—There is not the demand that manufacturers have been expecting, so that the feeling is one of disappointment all around. Under such conditions it goes without saying that prices are weak and unsettled, although nominally the same as last week. Mills are very short of orders, however, and if anything large is offered competition may lead to still further concessions. Ordinarily, however, quotations are about as follows:

	Iron.	Steel.
Tank Plates	1.80 @ 1.90¢	1.85 @ 1.95¢
Shell		2.15 @ 2.20¢
Flange	2.70 @ 2.90¢	2.40 @ 2.50¢
Fire-Box	3.00 @ 4.00¢	2.70 @ 3.20¢

Sheet Iron.—The demand is very slow, and mills are all piling up stock. Some of the best makes are placed with comparatively little difficulty, but for ordinary qualities there is almost no demand whatever, so that prices are weak and unsettled. Small lots of best makes are quoted about as follows:

Best Refined, Nos. 14 to 20.....2.20¢ @ 2.40¢
Best Refined, Nos. 21 to 24..... @ 3.10¢
Best Refined, Nos. 25 to 26.....3.20¢ @ 3.25¢
Best Refined, No. 27.....3.40¢ @ .....
Best Refined, No. 28.....3.50¢ @ .....
Common, ¼¢ less than the above.

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about ¼¢ lower than are here named:

Best Soft Steel, Nos. 14 to 20 .....3¢ @ 3⅛¢
Best Soft Steel, Nos. 21 to 24.....3⅛¢ @ ....
Best Soft Steel, Nos. 25 to 26.....3¾¢ @ ....
Best Soft Steel, Nos. 27 to 28.....4¢ @ ....
Best Bloom Sheets, ¼¢ extra over the above prices.
Best Bloom, Galvanized, discount.... @ 67½ %
Common, discount..... @ 70 %

Old Material.—Market exceedingly narrow, so that prices are to a large extent nominal. For such qualities and quantities as buyers happen to require about the following rates can be obtained, but on forced sales materially lower figures might have to be accepted: Iron Rails, $20.50 @ $21 asked, spot, or $22 delivered; Steel Rails, $16 @ $17, delivered; No. 1 Railroad Scrap, $19.50 @ $20, Philadelphia, or for deliveries at mills in the interior $20 @ $21, according to distance and quality; $14.50 @ $15 for No. 2 Light; $14 @ $14.50 for best Machinery Scrap; $13 @ $13.50 for ordinary; $14 @ $15 for Wrought Turnings; $9 @ $10 for Cast Borings, and nominally $22 @ $24 for Old Fish Plates, and $16 @ $16.50, delivered, for Old Car Wheels.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, March 8, 1892.

The first week in March did not find any improvement whatever in the Iron or Steel markets. Prices are lower on many lines than ever were known before in the history of the trade. When an improvement will come is a question that is a puzzle to every one and it is hard to get an opinion as to the future.

Pig Iron.—The past week was an extremely quiet one in Pig Iron circles and no transactions involving large amounts occured. The market lacks life and the situation is discouraging in the extreme. As we noted last week, a shut down of a number of stacks in the Mahoning and Shenango valleys has been decided upon and is expected to have a beneficial effect. Douglass Furnace at Sharpsville has been banked by Pierce, Kelly & Co. A meeting of the creditors of this firm will be held in Sharpsville on Wednesday the 9th inst., and it is expected that an extension will be granted to the firm. Notwithstanding the heavy output of Pig Iron in Allegheny County, projects are on foot which if carried out will largely increase the present heavy production. These involve the erection of from four to six additional stacks. While no decline in prices has occurred since our last report, weakness is visible all along the line, and it is not believed that an advance will come until the present heavy stocks are materially lessened. We quote as follows:

Neutral Gray Forge	$13.75	@ $13.00,	cash
White and Mottled	12.50	@ 13.00,	"
All-Ore Mill	13.75	@ 14.25,	"
No. 1 Foundry	14.85	@ 15.15,	"
No. 2 Foundry	14.10	@ 14.35,	"
No. 3 Foundry	13.75	@ 14.00,	"
Bessemer Iron	14.75	@ 15.00,	"
Warm-Blast Charcoal	18.50	@ 20.00,	"
Cold-Blast Charcoal	25.00	@ 27.00,	"

We are advised of two small sales of Bessemer Iron aggregating about 3500 tons at $14.60, cash, but they were made with some unusual conditions.

Ferromanganese.—No change to note, and we quote at $62.50 @ $63 for domestic.

Steel Billets.—No material change has occurred since our last report, and business continues to be done on a basis of $23 @ $23.25 at mill. A large sale involving about 10,000 tons is reported at $22.75 for deliveries extending into June, but it is said that the conditions under which this sale was made were such that it cannot be looked upon as evidence that additional orders could be placed at that figure. In fact, we are advised that a large buyer was in Pittsburgh last week prepared to place an extremely large order and was unable to do better than $23. The business was not placed, but may possibly be closed up this week. One of our mills here is said to have enough business booked to keep them busy until July 1 next.

Structural Material.—We can report a slight increase in demand and considerable business was placed last week, mostly in small lots. The demand from now on is expected to increase materially, as the building season is about opening. Plans for the erection of several large buildings it this city are being prepared, and the prospects for a busy building season are bright. We quote prices as follows: Beams and Channels on a basis of 2.25¢ for desirable orders and 2.35¢ for small lots. Angles, 1.90¢ @ 1.95¢; Universal Mill Plates, 1.90¢ @ 2¢; Tees, 2.50¢; Refined Iron Bars, 1.75¢; Steel Bars, 1.75¢.

Steel Plates.—The market is weaker and we have reduced quotations slightly. The demand continues light and but little business is being secured We quote Fire Box, 3.75¢ @ 4.15¢; Flange, 2.25¢ @ 2 30¢; Shell, 2.15¢; Tank, 1.90¢ @ 1.95¢.

Wire Rods.—The market does not show any improvement either in demand or prices, and no large transactions are noted. We quote at $32.75 at mill for fair-sized orders. A large order would no doubt shade this price.

Steel Rails.—During the past week an order was booked by the Braddock mill for 16,000 tons. The rails are for an extension of 160 miles to be built by the Missouri, Kansas and Texas Railroad. Prices remain at $30 for standard sections, f.o.b. at mill. Considerable speculation is being done as to the course to be pursued by the Cleveland Rolling Mill Company, as that concern will be in the market and is not tied up by the Rail agreement.

Muck Bar.—The demand does not show any improvement whatever, and there is very little doing. We are advised of several deals in progress that will probably be closed during this week. There have not been any sales, however, involving large amounts for a considerable time past. We quote at $24.75 @ $25 in the absence of sales.

Nails.—Business in Cut Nails does not show any improvement, and the scarcity of orders has brought about considerable cutting in prices. Pittsburgh does not play any part in Cut Nails, and in the Wheeling district only three concerns are making Nails. The opening of the building season may possibly bring about an improvement in the demand. We quote at $1.45 @ $1.50 for carload lots for 30¢ averages in the Wheeling district. As regards Wire Nails, the situation is much better, and the mills are pretty fully employed. We quote at $1.70 for carload lots, and $1.75 in small quantities. The demand for Wire Nails will undoubtedly be largely increased in view of the building season opening up.

Barb Wire.—Considerable activity prevails and orders are coming in very freely. One concern here has all the business it can take care of both in Wire Nails and Barb Wire. The Pittsburgh Wire Company, with works at Braddock, expect to be in the market within the next 60 days with both Plain and Barb Wire. We quote $2.25 @ $2.35 for Painted, and $2.70 @ $2.80 for Galvanized, f.o.b. at factory.

Wrought-Iron Pipe.—Our remarks of last week apply equally as well to the market this week. The business never was as bad as it is now, although several

large makers insist that an improved demand will soon be here. It is understood that one of the largest concerns in this district is considering the question of putting up a Steel plant and making Steel Tubing. It is fast becoming a recognized fact among the trades that in the near future Steel will enter very largely into the manufacture of Pipes and Tubing. Discounts remain as quoted last week, with orders being taken at large concessions.

Manufactured Iron.—The demand seems to be decreasing, and as a consequence prices are weaker. It is reported that one mill being operated by non union men has reduced the price of boiling from $5.50 to $5 ℔ ton, to go into effect on March 15. We quote as follows: No. 1 Bars at 1.62½¢ @ 1.65¢, 60 days, 2% off for cash. Bars from Old Rails at 1.50¢ @ 1.55¢. Plate and Tank Iron is dull and we reduce quotations to 1.75¢ @ 1.85¢; No. 24 Sheet at 2.50¢ @ 2.60¢, 60 days, or 2 % off for cash. Skelp Iron is quiet, quotations ruling at 1.60¢ for Grooved and 1.80¢ for Sheared, four months, 2 % off for cash.

Merchant Steel.—Trade is reported as only moderate, but an improvement is looked for when spring trade opens up. Prices are unchanged, as follows: Tool Steel, 6½¢ and upward, according to grade; Crucible Spring Steel, 4¢; Crucible Machinery Steel, 5¢; Bessemer Machinery Steel, 2.35¢ @ 2.45¢ ℔ lb.

Railway Track Supplies.—Only a fair amount of business is doing, with prices ruling about as follows: Spikes, 2.15¢, 30 days; Splice Bars, 1.70¢ @ 1.80¢; Track Bolts, 2.65¢ with Square and 2.75¢ for Hexagon Nuts.

Old Rails.—The market is extremely quiet and only small sales are being made. We quote Old Steel Rails at $16.75 @ $17 for short lengths, and $17 for miscellaneous lengths. No Old Iron Rails have been sold for consumption here for months.

Scrap Iron.—A moderate business is doing, but it is said that stocks here and at Chicago are heavier than for years. We quote No. 1 Railroad Wrought Scrap, $18 @ $18.25 ℔ net ton; Cast Scrap, $12.50 @ $13 ℔ gross ton; Steel Rail and Bloom Ends, $17.50 @ $18; Cast-Iron Borings, $9.25 ℔ net ton; Machine Shop Turnings, $12 ℔ net ton; Mixed Country Steel, $14 @ $14.25 ℔ net ton.

(By Telegraph.)

We note a sale of 1000 tons of Muck Iron at $25.25, delivered, equal deliveries in March, April and May freight 85¢ ℔ ton, the Iron netting the mill $24.40.

The offices of the Biddle Purchasing Agency, jobbers in Iron, Steel and Hardware, have been removed from rooms 706 and 707, Hamilton Building, Pittsburgh, Pa., to rooms 612 and 613, Ferguson Building, Third avenue, in that city.

Moorhead Brothers & Co., proprietors of Vesuvius Iron and Nail Works, at Pittsburgh, have reduced the wages of their puddlers from $5.50 to $5 per ton. The mill is operated non-union.

George Westinghouse, Jr., was elected president of the Union Switch and Signal Company of this city yesterday.

The Hostetter-Connellsville Coke Company, who recently purchased the business of the Hostetter Coke Company of Pittsburgh, with mines in the Connellsville region, paid the latter $3,000,000 for the property, giving a mortgage for half the amount and taking stock in the company at par for the remaining $1,500,000. The change was made for the purpose of disposing of the interests of Jesse H. Lippincott, insolvent.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, March 9, 1892.

The local Iron market has now become erratic; sellers are getting bewildered as they quote on numbers of inquiries without securing orders. It does not often happen that manufacturers of standard grades of goods lose sales continuously, but that seems to be the case now. The prices reported to them by buyers are so much lower than their own that they seem to be absurd. This condition of business cannot last long. Those who are selling so low will either get all the business they care to take or will have to drop out. The others are sustained by the very cheerful prospects. An immense amount of business is coming up here, which it is felt must impart a better tone to trade when it gets in full swing. The Torrance terminal elevated railroad, the completion of the West Side Elevated, the World's Fair intramural railroads, sundry viaducts through the city and quite a number of large buildings will provide a great deal of tonnage in the structural line, carrying with them also a large amount of work in other directions. It will be a busy summer for the structural works, and, of course, other manufacturers will be benefitted.

Pig Iron.—The last week has been very quiet. Even the carload demand has fallen off. A few large consumers have had to increase their requisitions, as they are melting more Iron than they had anticipated, but new business was light. The market is much disturbed by special prices made by some sellers for immediate delivery and prompt cash. They have established a wide margin between such sales and those made in the regular way. Production is to be sharply curtailed here in the near future, operations being shaped with that end in view. Hence the bargains now going on are not likely to last long. Much uneasiness is observable among sellers of Southern Coke Iron. They fear that the large companies now carrying such heavy stocks may decide to unload, which would demoralize the trade beyond all precedent. The owners of small plants of stacks in the South are reported to getting weary, and a number of them may soon blow out. There is some inquiry for Lake Superior Charcoal, but there has been very little actual business, and yet prices appear to be well maintained by the makers. Quotations are unchanged, as follows:

Lake Superior Charcoal	$17.00 @ $17.50
Local Coke Foundry, No. 1	14.50 @ 15.00
Local Coke Foundry, No. 2	14.25 @ 14.50
Local Coke Foundry, No. 3	14.00 @ 14.25
Local Scotch	15.50 @ 16.00
Ohio Strong Softeners	17.25 @ 17.75
Southern Coke, No. 1	15.50 @ 15.75
Southern Coke, No. 2	14.50 @ 14.75
Southern Coke, No. 3	13.75 @ 14.00
Southern, No. 1, Soft	14.50 @ 14.75
Southern, No. 2, Soft	13.75 @ 14.00
Southern Gray Forge	13.50 @ 13.75
Southern Mottled	13.00 @ 13.50
Tennessee Charcoal, No 1	17.50 @ 18.00
Alabama Car Wheel	21.00 @ 23.00
Coke Bessemer	16.50 @ 17.00
Hocking Valley, No. 1	17.25 @ 18.50
Jackson County Silvery	17.50 @ 18.00

Spiegel.—Spiegel is firm at $28 for 20 %, but only a light trade is doing.

Bars.—The Bar Iron market has been very irregular. Some mills are so hungry for work that they have made exceedingly low prices on sizes which they can roll, but at the same time general orders cannot be placed much, if anything, below 1.65¢, half extras. Inquiries are light, the only large order in sight coming from a railroad company wanting guaranteed Iron. Soft Steel Bars continue to be quoted at 1.75¢ @ 1.80¢ from mill and 1.90¢ @ 2¢ from store.

Structural Shapes.—The building contracts closed the past week cover some 2000 tons of beams, so far as known, at about 2.25¢. Prices range from that to 2.40¢ for standard sizes and 2.70¢ for 20-inch. Angles are still quoted at 1.95¢ @ 2 10¢; Tees at 2.50¢, and Bridge Plates at 2¢ @ 2.10¢, from mill. Prospects of structural work are more fully treated above.

Plates.—Larger sales are being made from stock at 2.40¢ @ 2.50¢ for Tank Iron and Steel; 2 50¢ @ 2.60¢ for No. 10 to No. 14 Iron and Steel Sheets; 2.90¢ @ 3¢ for Flange Steel, and 2.65¢ @ 2.75¢ for Shell Steel. Carload lots of Tank Steel have sold from 2¢ to 2.25¢, from mill.

Sheets.—Black Sheets are quiet and unchanged. Galvanized Iron is in moderate demand, with no immediate prospect of better prices.

Merchant Steel.—The mills making the best grades of cheap Steels are well supplied with work and continue to receive orders from manufacturing consumers, while specifications on old contracts are coming in very freely. Makers with not such a high reputation compete sharply for work at 2¢ @ 2.10¢ for Open-Hearth Machinery and 2¢ @ 2.25¢ for Open-Hearth Spring and Tire. Tool Steel is weaker and is being sold at 6½¢ @ 6½¢ from stock for ordinary.

Track Supplies.—A considerable tonnage of Steel Rails is in sight and quite a number of good inquiries have been received here, promising an increased volume of business shortly. Quotations range from $31.50 upward. Iron and Steel Splice Bars are still quoted at 1 80¢, Spikes 2 15¢ @ 2.20¢ and Track Bolts, Hexagon Nut, 2.65¢ @ 2.75¢. It is reported that the Spikes and Track Bolts mentioned last week were secured by St. Louis.

Old Rails and Wheels.—Old Iron Rails are going begging, and while nominally quoted $20 @ $20.50 could not be sold at over $18 if forced on consumers, who are now well supplied. Old Steel Rails are worth about $13.50 @ $14 for short pieces, with long lengths neglected. Car Wheels are held at $16 @ $16.25, with consumers indifferent about them.

Scrap.—Dealers are getting uneasy at the long dullness in Wrought Scrap, and it would not be surprising if the market should drop to $16 for No. 1. Railroads are endeavoring to sell to mills direct. Cast Scrap and Steel are in fair demand. Borings and Turnings are going in small lots only.

Metals.—Copper is firmer, under advices from Lake producers that they intend to restrict their output. Carload lots of Lake are now quoted at 11¢, and casting brands 10.75¢. Spelter is soft, being now quoted at 4.40¢, and perhaps to be had a little lower. The Pig Lead market is a trifle weaker, but dealers continue to quote at 4¢.

George S. Griscom, president Lakeside Nail Company, who has made such a conspicuous success in building up the business of that company, has accepted the presidency of the Moorhead-McCleane Company of Pittsburgh and will take charge at once. Mr. Griscom is a man of indefatigable energy and large experience in managing great interests, and besides is the choice of the financial institutions who are carrying the indebtedness of the Moorhead-McCleane Company. He has made hosts of friends in the Northwest, who will hear of his departure with regret.

Andrew Hawthorne, formerly of Cincinnati, has been appointed Chicago manager for Chamberlain, Turney & Baird of Columbus, Ohio, agents for the sale of Hocking Valley high-silicon Pig Irons. Mr. Hawthorne has opened an office in The Rookery, room 649, and has already made a favorable impression on the local Pig Iron trade.

Cleveland.

CLEVELAND, Ohio, March 7.

Iron Ore. — The pessimists, always searching for the gloomy side of the pictures, seem to have over-exerted themselves. The situation is somewhat discouraging, but there is really no occasion for the blood-curdling caricatures upon the outlook that are being painted by some writers. The number of inquiries received by the Ore men during the past three or four days would seem to indicate an active revival of the buying movement inaugurated so auspiciously a few weeks ago. It is true that very little Ore has been sold during the past two or three weeks, but it looks to-day as if several hundred thousand tons would be let go before March 15. A strong fight for lower freight rates has been inaugurated. That the condition of the Pig Iron market justifies such a fight is beyond question. That it will result successfully is not so certain. An effort is being made to get the Ashland rate down to $1.10 @ $1.15 and the Escanaba rate reduced from $1 to 85¢ @ 90¢ ℔ ton. A half-dozen vessel men, who were talked with to-day, said that navigation would open the very first hour that the disappearance of ice made it possible. It may be that a few season charters will be booked at rates below those prevailing when the early sales were made, but this seems hardly possible. Very little Ore has been sold since February 15, but the Ore men seem to think to-day that there will be some important sales within the next ten days. There have certainly been an unusual number of inquiries from Eastern furnacemen and a few buyers seem anxious to cover their immediate wants. The Ore sent down last season is being rushed forward to the furnaces at break-neck speed. During the week just closed about 36,000 tons were sent on from Cleveland, while the shipments from all Lake Erie ports aggregated over 100,000 tons. For the same week last year the shipments from Cleveland did not exceed 11,000 tons, while from all the ports on the lower lakes combined only 29,000 tons were sent forward. There is some talk of a reduction in prices, but just how it is to be brought about is something that nobody seems able to explain. It is true, however, that the furnacemen are unable to see their way clear to a general anticipation of their wants just now. They need the Ore all right, but the Pig Iron market is so woefully dull that it needs a furnaceman with the courage of a lion to go ahead and engage the Ore he is likely to need for the next 12 months. There have been a few sales during the past week of high-grade Bessemer Ore at an average advance of 35¢ ℔ ton over the price prevailing in 1891, but the amounts involved were generally small. The Ore men believe, however, that not less than 1,000,000 tons of Bessemer Ore will be sold within the next ten days or two weeks, basing their estimates on the unusual demand that despite all the depressions and disappointments is just now being made. There is thus far in the season no appreciable inquiry for Mill Irons and the market for the non-Bessemer is not likely to open much before April 1.

Pig Iron.—But very little is being done, although a more hopeful feeling prevails this week. It is said that several furnaces in the Mahoning Valley will shut down within a few days, although it is admitted that there is an improvement over the condition of things existing a week ago. During the past week there has been something of a demand for Bessemer and Foundry Irons, although the aggregate amounts sold are unimportant. A very slight change for the better in the Pig Iron market would mean a better feeling all around. The fact that production, for a time at least, outpaces consumption seems to be responsible for the present slump.

Old Rails.—The demand is not very brisk, even for Old Americans, at $22 @ $22.25. A few unimportant sales at these figures are reported. Old Car Wheels, at $17.50 @ $18, are in but slight demand.

Scrap.—The market is rather weak, and only a few scattering sales are reported. No. 1 Railroad Wrought is quoted at $18.75 @ $19.25, and Cast Scrap at $13.25 @ $13.75.

Manufactured Iron.—The mills are still very busy, but prices remain about the same—1.60¢ @ 1.65¢ for Common Bar, with Sheets scarce and valuable, and Structural Iron in good demand.

Nails.—Steel Wire Nails seem firmer at $1.80 ℔ keg, while Steel Cut Nails are quoted at $1.65 @ $1.70.

St. Louis.

Office of *The Iron Age*,
Bank of Commerce Building,
ST. LOUIS, March 7, 1892.

Pig Iron.—The market continues on its downward course, and during the last two or three days Pig Iron has been offered at prices that are lower than ever before quoted. A sale of 1000 tons No. 2 Foundry is reported at $10.35, f.o.b. at the furnace. Furnaces are rapidly accumulating large quantities of Iron in their yards, and the question as to what they will do with it is an interesting one, and one difficult to answer. Consumers are buying sparingly, and are all looking for even lower prices than at present prevailing. Gray Forge is freely quoted at $9.25, at the furnace, and it is intimated that this price could be shaded on a desirable order. Local business is light, and prices are gradually reaching a lower level. The immediate future holds nothing that can be called encouraging, and prices seem destined to be lower. We quote as follows for cash, f.o.b. St. Louis.

Southern Coke, No. 1 Foundry,	$14.50 @ $15.00
Southern Coke, No. 2 Foundry,	13.75 @ 14.25
Southern Coke, No. 3 Foundry,	13.00 @ 13.50
Gray Forge	12.50 @ 12.75
Southern Charcoal, No. 1 Foundry	16.75 @ 17.25
Southern Charcoal, No. 2 Foundry	16.00 @ 16.50
Missouri Charcoal, No. 1 Foundry	15.25 @ 15.75
Missouri Charcoal, No. 2 Foundry	14.75 @ 15.25
Ohio Softeners	17.75 @ 18.75

Bar Iron.—There is not much doing in this department, and prices are further inclined to weakness. Car builders are busy, but aside from this the demand is only spasmodic. We quote as follows: Car lots at East St. Louis, 1.65¢ @ 1.70¢, half extras; lots from store, 1.80¢ @ 1.85¢, according to quantity.

Barb Wire.—Trade in this department is not as active as it was one week since, neither are prices quite as strong. Lower prices in raw material have had the effect of weakening values of the finished product. We quote as follows: Less than car lots of Painted, $2.60; Galvanized, $3.05. Carload orders are quoted at 10¢ ℔ cwt. less than these prices. On good round orders the above prices will stand shaving.

Wire Nails.—There is a lull in the demand for Wire Nails, no doubt influenced by the wretched weather prevailing in this locality during the past week. The outlook is encouraging, however, for a large spring trade. We quote as follows: For medium sized orders the $2.05 rate prevails, while jobbers quote $2.10 @ $2.15 for small lots. Mills quote $1.95 for carload orders.

(By Telegraph.)

Pig Lead does not show much change since our last report. A few odd lots have changed hands at from 3.92½¢ to 3.95¢. A sale of 150 tons of Chemical is reported at 4¢. Stocks are accumulating, however, and higher prices do not seem probable, that is, in the near future. Spelter is the same as last reported. Buyers are as scarce as flies in winter time and prices continue droopy and unsatisfactory. Offerings are free at 4.25¢, but no sales are reported.

Carnegie, Phipps & Co., Limited, will remove their offices, on or about April 1, from the Bank of Commerce Building to the *Globe-Democrat* Building.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, March 9, 1892.

The depression in the market has been intensified during the past week and the willingness of sellers to meet the views of buyers has made it possible to enlarge the volume of business. The sales embrace upward of 30,000 tons of Gray Forge and Nos. 2 and 3 Foundry Iron for delivery rmnning all through this year. The exact prices have not transpired, but it is known that concessions were made on Gray Forge from $9.25 at the furnace and that No. 3 foundry sold as low as $9.50 at the furnace. There has been about the usual volume of current consumptive trade, for which better prices were obtained on the consumptive side of the market; there is a fairly satisfactory volume of business; the foundries are melting much Iron; the car works are known to be pushed with urgent orders and there are evidences that the iron pipe works are obtaining more orders and will shortly require more Iron.

The announcement to-day of a probable consolidation of the leading furnaces in the South imparted a more confident feeling to the Iron trade and some agents refused to entertain orders at old rates until the outcome of the project could be determined. There is no doubt that much more Iron will be required than is under contract, and if there is a reasonable prospect of higher prices it will bring buyers to a realizing sense of the cheapness of Iron. We quote:

Foundry.	
Southern Coke, No. 1	$14.25 @ $14.50
Southern Coke, No. 2	13.25 @ 13.50
Southern Coke, No. 3	12.25 @ 12.50
Ohio Soft Stone Coal, No. 1	16.00 @ 16.50
Ohio Soft Stone Coal, No. 2	15.00 @ 15.50
Mahoning and Shenango Valley	17.00 @ 17.50
Hanging Rock Charcoal, No. 1	19.75 @ 20.00
Hanging Rock Charcoal, No. 2	19.00 @ 20.00
Tennessee and Alabama Charcoal, No. 1	16.50 @ 17.00
Tennessee and Alabama Charcoal, No. 2	15.50 @ 16.00
Forge.	
Gray Forge	12.00 @ 12.25
Mottled Neutral Coke	11.75 @ 12.00
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	19.75 @ 20.00
Lake Superior Car Wheel and Malleable	18.75 @ 19.00

Louisville.

LOUISVILLE, KY., March 7, 1892.

There is no improvement in prices. Some offerings have been made below $9.50, furnace, for Gray Forge, but this was for prompt delivery and for exceptional reasons. The stock of Iron is heavy, but not so large but that same could be quickly cut down in case there is heavy buying on the part of railroads. While the demand for cars is large, and these companies report plenty of work yet for general repairs, the orders of most railroad companies have been small, and as this line of policy has been carried out for more than a year it is felt that it cannot be to the interest of companies to much longer keep from buying, especially when the prices offered are

so advantageous. That there will be no special advance in prices for some months to come is felt, but that no one can make a mistake in buying freely when they have need of Iron is quite evident. Mill Iron, at $9.50 at furnace, is lower than many furnaces can afford to sell at, and those most advantageously situated will not care to offer Iron on this basis long. In Car-Wheel Irons there is no change. Old Wheels are on basis of $16, cars, Louisville. We quote for cash, f.o.b. cars, Louisville:

Southern Coke, No. 1 Foundry	$14.00 @ $14.50
Southern Coke, No. 2 Foundry	13.00 @ 13.50
Southern Coke, No. 3 Foundry	12.50 @ 12.75
Southern Coke, Gray Forge	12.00 @ 12.25
Southern Charcoal, No. 1 Foundry	15.75 @ 16.75
Southern Car Wheel	18.00 @ 19.00

New York.

Office of *The Iron Age*, 96-102 Reade street, NEW YORK, March 8, 1892.

B. G. Clarke, president of the Thomas Iron Company, the most influential producer of Foundry and Forge Irons for the open market east of the Allegheny Mountains, making about 180,000 gross tons annually, expressed the following views in conversation with a representative of *The Iron Age*: "It is quite evident that the production of Pig Iron is considerably in excess of the requirements and the question naturally arises what should be done. Shall we keep running and pile our Iron, or shall we meet the market by making a reduction of $1 or $2 ℔ ton, or finally, would it be better to blow out half of our furnaces? While it is true that we have for years had orders enough from our regular customers to take all our Iron without making any effort to sell, we will lose a part of our trade if we take the latter alternative. We have always protected our customers, who are now paying us $17.50 for No. 1 Foundry and $16 for No. 2. If we do not reduce the price to them they may be under bid by smaller rival concerns who use the cheaper Irons now offering." While Mr. Clarke did not commit himself as to the course which he would adopt, his actions in the past and his tone at the present juncture justify the inference that a reduction in the price will be made, and that the chances are in favor of a drop of $2 ℔ ton. An equally important event is the possible consolidation of the three largest producers in the Birmingham district—the Tennesssee Coal and Iron Company, the DeBardeleban Coal and Iron Company and the Sloss Iron and Steel Company. These concerns control 17 furnaces in the Birmingham district and four furnaces in Tennessee, whose total product, running full, with the average number out for repairs, was 309,753 gross tons, so that the annual product may be rated at fully 600,000 gross tons, and would rank it next to the Carnegies and the Illinois Steel Company. We deal with the effect of the consolidation elsewhere. Business during the month has been light, and low prices, particularly for Southern Iron, prevail in this district and in New England. No. 1 Birmingham has been offered, delivered at Troy, at $15.90, and relatively as low prices have been made at New England points. We quote Northern brands, $16 @ $17.50 for No. 1; $15 @ $16 for No. 2, and $14 @ $14.50 for Gray Forge, tidewater. Southern Iron sells at $15.50 @ $16.50 for No. 1; $14.75 @ $15.50 for No. 2 and No. 1 Soft, $13.75 @ $14 25 for No. 2 Soft; $13.25 @ $13.50 for Gray Forge.

Ferromanganese and Spiegeleisen.—There have been no transactions in either Spiegel or Ferro, which we quote $23 @ $23.50 for 10 to 12 %. $26.50 @ $27 for 20 %, and $62 @ $62.50 for Ferro.

Billets and Rods.—In domestic Billets and Rods the market in this section is exceedingly dull, and is adversely influenced by the reports of low prices in the West. We quote domestic Billets $25.50 @ $26, and Rods $35.50@ $36. In foreign Billets some sacrifice sales have been made at exceedingly low prices during the past two weeks, and a lot of 250 tons, recently arrived, has gone into store. The expected business in foreign Rods for Pacific Coast delivery has not been done.

Steel Rails.—One Eastern mill quotes sales aggregating about 6000 tons, including one 4000-ton lot for the Pacific Coast. The market is dull, but steady, at $30, at Eastern mill.

Manufactured Iron and Steel.—Merchants complain that specifications are coming in very slowly, and the mills are hungry for immediate work. The following contracts for bridge work, taken by Eastern mills, have been published: Pencoyd, 650 tons for the Burlington road, and 700 tons for the Fort Scott; Passaic Rolling Mill, 600 tons for Knoxville and Edgemoor, the Great Northern bridge at Minneapolis. The Lehigh Valley order is now reported to have amounted to 4000 cars, one-half of which to McKee, Fuller & Co., 1000 to Jackson & Woodin, and 500 each to Pardee and Buffalo. Beams are dull in the market at 2.25¢ for round lots and 2.40¢ @ 2.50¢ for small lots. We quote: Angles, 1.85¢ @ 2.10¢; Sheared Plates, 1.8¢ @ 2.25¢; Tees, 2.40¢ @ 2.75¢, and Beams 2.30¢ @ 2.80¢; Channels, 2.30¢ @ 2.50¢, on dock. Car Truck Channels, 2¢ @ 2.10¢; Steel Plates are 1.85¢ @ 2.1¢ for Tank; 2.15¢ @ 2.30¢ for Shell; 2.40¢ @ 2.65¢ for Flange; 2.60¢ @ 2.75¢ for Marine, and 3¢ @ 3.25¢ for Fire Box, on dock. Bars are 1.7¢ @ 1.9¢, on dock. Scrap Axles are quotable at 2¢ @ 2.20¢, delivered. Steel Axles, 2¢ @ 2.2¢, and Links and Pins, 2.1¢ @ 2.20¢; Steel Hoops, 1.9¢ @ 2.05¢, delivered.

Merchant Steel.—We quote: Hot-Rolled Shafting, 1.90¢ @ 2¢; Machinery, 1.90¢ @ 2.10¢; Tire, 2¢ @ 2.25¢, and Toe Calk, 2.20¢ @ 2.35¢, delivered.

Track Material.—We quote Spikes, 1.95¢ @ 2.05¢; Angles, 1.65¢ @ 1.70¢, and Bolts, 2.60¢ @ 2.75¢, delivered.

[*Later.*]

The Thomas Iron Company have announced the price of Thomas Iron up to July 1 next, at $16.00 for No. 1 x, $15.00 for No. 2 x, at Jersey City.

George H. Lloyd, representative in Boston of the Central Iron Works, Marshall Bros. & Co., and the Reading Iron Company, has removed to the Mason Building, Liberty Square.

The American Pig Iron Storage Warrant Company report stocks in yard as follows:

	Tons.
January 1	51,900
February 1	55,900
March 1	57,700

During January 4400 tons were put in yard and 400 tons withdrawn, and during February 3300 tons were added and 1500 tons taken out.

L. Hernsheim, Iron and Steel merchant, has moved his offices from 40–42 Wall street to the Columbia Building, 29 Broadway.

Metal Market.

Copper.—The rumor has gained active circulation that a proposition to curtail production has received the serious attention of the Calumet and Hecla, the Anaconda and the Bigelow groups of producers, and that suspension of work for two months or more has practically been agreed upon. As to the accuracy of this report confirmation is wanting, but the spread of the report has had the effect of temporarily stiffening prices here, and a further rumor that it has been practically agreed upon to curtail output in Chili as well as in the United States has led to a decided advance in values in the European market. From some points of view, contemplated action of this sort is looked upon as a confession of weakness on the part of producers and as unmistakable evidence that supply is excessive and the outlet disappointing. Whether the proposition will be carried through is another of the numerous uncertainties that have come to the surface during the past 60 days, but thus far the reports in circulation seem to have had greater weight in the English market than on this side of the Atlantic. The tendency of buyers here is to proceed cautiously, in fact, while more or less nervous speculative sentiment has been stirred up in Europe. Another rumor is going the rounds to the effect that a movement is under way to consolidate the manufacturers of Copper and Brass goods (Sheathing, Tubing, &c.) into one gigantic concern with a common selling agency, under the plan of lately reorganized "trusts." As to the alleged movement in that direction doubts are even greater than those prevalent regarding the proposition to curtail production of crude material, however, and the situation from top to bottom is shrouded in uncertainty. Pending developments, the reports as to reduced output by the mining companies carry some weight, and cheap lots have disappeared from the market, temporarily at least. At present 10¾¢ appears to be bottom price for Lake Superior Ingot, and up to as high as 11¢ is quoted by some sellers, while 10½¢ has become a popular quotation for common casting Copper. Moderate quantities of Lake Superior product have been sold at 10¾¢, but the demand is slow and hesitant, with strong circumstantial evidence that home consumers are slower than the European interests to be affected by the reports of restricted production as outlined above.

Pig Tin.—In a speculative way there have been transactions involving 100 tons of Straits for April, May and June delivery at 19¼¢ and 5 tons per month for delivery from May to December inclusive at 19.85¢. These transactions were confined within a narrow speculative circle, in which deals of similar character have figured with more or less prominence in the past and reflect nothing more than nerve to repeat old ventures. Apart from those mentioned the speculative operations have been on a small scale, involving about 75 tons for prompt and current month delivery at 19.60¢ @ 19.65¢, or practically the same prices that ruled a week ago. For trade and consumptive account purchases have been of strictly routine character and merely fair for the season, with the above named prices the rule are on 5 to 10 ton lots and 19¼¢ @ 19⅓¢ the range on smaller quantities out of store.

Pig Lead.—Consumers have purchased very sparingly in this market and from other sources the demand has continued light also, leaving the market dull and practically stationary. Single carload lots for prompt delivery brought 4.22½¢, but larger quantities, it is understood, could have been secured at 4.20¢, and bids of over 4.17½¢ are the exception at the moment. The supply on offer has been somewhat larger the past week than during the one immediately preceding but without evidence of a great deal more anxiety on the part of smelters.

Spelter.—Western Spelter is more or less irregular in price, and the market remains in uncertain shape, with some evidence that supplies in the hands of smelters are still rather burdensome. On some of the more favored brands 4.60¢ is quoted, but others may be secured at 4.55¢, and as low as 4.52½¢ is said to have been reached

on near future shipments, including some parcels for delivery at Philadelphia.

Antimony.—While prices are not radically lower, the market is still rather weak, and the cheaper varieties seem to be gradually worked in where highest cost product was formerly used almost exclusively. Present prices are about 10¾¢ quoted for Hallett's 12¢ for LX and 14¾¢ @ 15¢ for Cookson's, in wholesale quantities.

Tin Plate.—For spot goods the demand has been uneven and chiefly of retail character and fairly well distributed over the general line. Here and there special deals have gone through at modified prices, but, upon the whole, values stand very much the same as they were last week. In lightweight Cokes for future delivery business has been fair at slightly lower range of prices, but the buying of futures as well as spot stock is conservative for the most part and the market looks rather soft. We quote as follows for full weights: Coke Tins—Penlan grade, IC, 14 x 20, $5.25; J. B. grade, do., $5.35; Bessemer do., $5.30; Siemens Steel, $5.37½. Stamping Plates—Bessemer Steel, Coke finish, IC basis, $5.60 @ $5.65; Siemens Steel, IC basis, $5.75 @ $5.80; IX basis, $6.80. IC Charcoals—Melyn grade, ½ X, $6.35; for each additional X add $1.50; Allaway grade, $5.75; Grange grade, $5.85; for each additional X add $1.20, Charcoal Ternes — Worcester, 14 x 20, $5.75; do., 20 x 28, $11.37½; M. F., 14 x 20, $7.37½; do., 20 x 28, $14.75; Dean, 14 x 20, $5.50; do., 20 x 28, $10.60; D. R. D. grade, 14 x 20, $5.35; do., 20 x 28, $10.25; Mansel, 14 x 20, scarce; do., 20 x 28, $10 50; Alyn, 14 x 20, $5.45; do., 20 x 28, $10.50; Dyffryn, 14 x 20, $5.65; do., 20 x 28, $10.90. Wasters—S. T. P. grade, 14 x 20, $5.10; do., 20 x 28, $10; Abercarne grade, 14 x 20, $5; do., 20 x 28, $9.65.

Financial.

During the week past the stock market has been rather heavy, with some fluctuations on the Vanderbilt stocks and in the New England, based upon rumors respecting the management of the latter. A rise in Lake Share carried up the other Vanderbilt stocks, and the whole market closed strong on Saturday. On Monday the market was variable, with New England heavy, but with only slight declines. At the close of the day the coal stocks were unsettled and lower. On Tuesday the stock market was fluctuating, and closed heavy, after a free selling of Reading, New England and St. Paul, which depressed the whole list. The bids for Government bonds were:

	First board.		Last board.
U. S. 4½s, 1891, extended	100	@	100
U. S. 4s, 1907, registered	116	@	116
U. S. 4s, 1907, coupon	117	@	117
U. S. currency 6s	109	@	109

Cash loans remained the same, but the demand for long loans was such that there was a slight advance, The rates were 3 % for 30 days, 3½ % for 90 days to 4 months, 4½ % for five months, and 5 % for 6 to 7 months. Money has been abundant. The Treasury issued in new notes $500,000 against $200,000 received. The increase in circulation was $6,000,000. Government receipts during February were $30,755,905. In February, 1891, they were $29,611,316.

The bank loans increased $7,795,300, in face of the fact that the reserves have been diminished $5,267,500, leaving them $21,273,475 above the legal limit. The conjecture is entertained in some quarters that money may have been borrowed with which to carry for a time much of the stock which has been returned from Europe. The decrease in specie was $3,334,500.

Foreign exchange, early in the week, was steady at $4.86 for 60-day and $4.88½ for sight, but on Thursday there was an advance to $4.86½ on long rates, on account of lower discounts in London. Shipments of gold to Europe were $2,280,000.

The earnings of the railroads continue to be good. For the third week in February 87 roads show $537,189; increase, 6.52 %; and for the fourth week 27 roads exhibit $826,905; increase, 22.97.

Cotton has fallen to the lowest point it has touched in 40 years. The large number of bales received, 8,000,000, in so much of the year as has passed, indicates that the crop is exceptionally large. Hopes for the future are based upon the purpose to plant a diminished acreage, but with that purpose known there is nothing to prevent a defeat of the result intended, through excessive planting by persons who may hope to be rare exceptions to the scheme of diminished planting.

Wheat has declined 2¢ in price, which was to have been expected, in view of the fact that there is a supply abundant enough to meet any possible demand, and there has been no solid reason for the advance. The export fell off somewhat. An increased acreage for next year is likely, because of the prices obtained in this. Maize has advanced ½¢. The exports have been 12,648,795 bushels. The effort is making, with some prospect of success, to substitute this grain for wheat in the European market. Oats have receded slightly in price. Pork remains the same. Oil has risen 1⅜¢, and coffee has fallen slightly.

The exports for the week ending March 8 were $7,230,530, making a total since January 1 of $83,538,599, in contrast with $66,562,441 in the same period in 1891, and $67,323,668 in 1890. This does not include specie. The exports fell $1,024,481 below those of the week previous.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, March 9, 1892.

The market for Pig Iron warrants has been irregular, with a very fair business in English sorts, but only moderate movement in Scotch and Hematites. Scotch prices have stood at about 40/3, those for Cleveland averaged somewhat lower, at 35/3 @ 35/7, and Hematites receded to 45/4½. Some speculative interest has been aroused by anticipation of a rise in price of Coal and increase of cost of production, but that has died out the past few days and the market at present is flat. Consumptive demand is moderate and export movement spiritless, but Board of Trade returns show exports last month of 40,000 tons, against 38,000 tons in February, 1891. Stocks of Scotch Iron in warrant stores have decreased to 498,000 tons, and those of Cleveland Iron to 157,000 tons.

The Pig Tin market has been easier during the last half of the week, with only moderate business on speculative account and hardly average purchases for consumption. The bulk of supply, however, is still very well under control.

Copper has been active at a higher range of prices, with larger purchases by consumers as well as brisk speculative trading. Further reports of combination of American producers to regulate production and secure better prices have been instrumental in helping prices upward, but better purchases for consumption and improvement in European statistical position helped to strengthen the market.

Tin Plate has been in fair demand, but large buyers hold aloof, owing to lack of confidence in the future of the market. Business has been chiefly in light weight Bessemer squares at 11/9, and Siemens do. at 12/3, f.o.b. Swansea. Exports last month were 33,000 tons, including 23,000 tons to the United States, against 32,000 tons and 28,000 tons in February 1891.

Ship Plates very quiet and the market easy. Several mills in Cumberland district are idle owing to scarcity of orders and fuel.

Old Iron is rather weaker and more freely offered.

Scotch Pig Iron.—Demand continues slow, and prices have undergone little change.

No. 1 Coltness,	f.o.b. Glasgow		53/
No. 1 Summerlee,	"	"	50/6
No. 1 Gartsherrie,	"	"	50/
No. 1 Langloan,	"	"	51/6
No. 1 Carnbroe,	"	"	43/6
No. 1 Shotts	"	at Leith	52/
No. 1 Glengarnock,	"	Ardrossan	51/
No. 1 Dalmellington,	"	"	48/
No. 1 Eglinton,	"	"	47/

Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 7/6.

Cleveland Pig.—The market is unsettled, with fair business the last few days at about 35/9 for No. 3, f.o.b. Middlesborough.

Bessemer Pig.—Business continues rather slow and the market is barely steady at 48/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Spiegeleisen.—A very quiet market, with prices unchanged. English 20 % quoted at 80/, f.o.b. shipping port.

Steel Rails.—Orders come forward slowly and the market is barely steady. Heavy sections quoted at £4. 5/, f.o.b. shipping port.

Steel Blooms.—There is little doing and prices are nominal. Makers ask £4. 2/6 for 7 x 7, f.o.b. shipping point.

Steel Billets.—Dealings are still of moderate volume and makers' prices without change. Bessemer, 2½ x 2½ inches, quoted at £4. 5/, f.o.b. shipping point.

Steel Slabs.—Very slow market, and no change in sellers prices. Bessemer quoted at £4. 5/, f.o.b. at shipping point.

Old Iron Rails.—Demand runs light and prices are easy without quotable change. Tees quoted at £2. 17/6 and Double Heads at £3, f.o.b.

Scrap Iron.—There has been a fair business, and prices steady. Heavy Wrought Iron quoted at £2. 10/ @ £2. 12/6, f.o.b.

Crop Ends.—Dull market for these and prices unchanged. Bessemer quoted at £2. 12/6 @ £2. 15/, f.o.b.

Tin Plate.—Demand is irregular and prices still lean in sellers' favor: We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade	14/ @ 14/6
IC Bessemer Steel, Coke finish	12/6 @ 12/9
IC Siemens " "	12/9 @ 13/
IC Coke, B. V. grade 14 x 20	12/3 @ 12/6
Charcoal Terne, Dean grade	12/ @ 12/3

Pig Tin.—A steady market at the close, but dealings moderate. Straits quoted at £89. 5/, spot, and £89. 10/ for three months.

Manufactured Iron.—The condition of the market is unchanged, business being rather slow. We quote, f.o.b. Liverpool:

	£	s.	d.		£	s.	d.
Staff. Ordinary Marked Bars	8	10	0	@	.....		
" Common "	6	10	0	@	6	12	6
Staff. Bl'k Sheet, singles.. .	7	15	0	@	.....		
Welsh Bars (f.o.b. Wales)....	5	10	0	@	.....		

Copper.—Prices a shade easier at the close under realizations. Merchant Bars quoted at £44. 7/6, spot, and £46, three months' futures. Best selected, £49.

Lead—Business fair and the market steady at £10. 15/ for Soft Spanish.

Spelter.—The market steady but quiet at £21. 2/6 for ordinary Silesian.

The Proposed Southern Consolidation.

During the past few days a series of lengthy conferences have taken place between the officers of the three leading furnace companies of the Birmingham district, the Tennessee Coal Iron and Railroad Company, the De Bardeleben Coal and Iron Company and the Sloss Iron and Steel Company. The negotiations have progressed far more favorably than was at first thought probable, but are still in such a form that they may be broken off. It is believed however, that the chances are in favor of their consummation. The matter is one of widespread interest to the iron trade of the country and to the Southern coal trade. The Tennessee Coal, Iron and Railroad Company have a bonded indebtedness of about $5,500,000 6 per cent. bonds, has outstanding $1,000,000 8 per cent. preferred stock and $9,000,000 common stock. It has four large furnaces at Ensley near Birmingham, two Alice furnaces at Birmingham, three at South Pittsburg, Tenn., and one at Survance, Tenn. The De Bardeleben Coal and Iron Company have seven furnaces in the Birmingham district, two of them being the former Eureka furnaces. The Sloss Iron and Steel Company operates four furnaces in the district, the two older Sloss City, and the North Birmingham stacks. The aggregate capacity of these plants is about 700,000 tons of pig iron per annum, the actual output during the last six months of 1891 having been 309,753 gross tons. All of the companies are owners of large tracts of coal and iron lands, the Tennessee Company controlling 161,000 acres, the De Bardeleben 159,000 acres, and the Sloss 40,000 acres.

The Sloss Iron and Steel Company have outstanding $2,000,000 6 per cent. bonds, $2,000,000 income bonds and $3,700,000 stock, while the De Bardeleben carries $3,000,000 6 per cent. bonds, and $10,000,000 common stock, a total for the whole group of $10,500,000 6 per cent. bonds, $1,000,000 8 per cent. preferred stock, $2,000,000 income bonds and $22,700,000 common stock. The basis on which these securities will be placed in the new consolidation has not been decided.

In addition to the enormous iron business, which would place the consolidation in the position of being by far the greatest factor in the open market for forge and foundry irons, the concerns do a very large coal business. The Tennessee Company mine daily at their Pratt mines 4000 tons; at their Sewanee mines, in Tennessee, 1500 tons, and at Whitwell, Tenn., 800 tons. The Sloss Company have a capacity of 3700 tons daily, and the De Bardeleben of 3000 tons daily, a total of 13,000 tons of coal per day. All of the concerns have their own coke-making plants, and some produce far in excess of their own requirements, selling the excess in the open market.

We understand that competition in the coal trade has been very sharp and the consolidation would permit a better revenue to be obtained on this branch. All of the companies mine large quantities of ore, some of the most valuable tracts being controlled by them.

The mineral properties in the Birmingham district are interlaced and the consolidation would permit of very considerable economies in the distribution of the raw material to the different plants. Ore from the mines of one company is now hauled by the stables of another company, and coal could be carried from other mines at a heavy reduction in cost by the railroad system of the Tennessee Company. There is little doubt that the consolidation would be a very good move for those interested in the individual concerns.

So far as the iron trade generally is concerned, it is evident that the control of a product of upward of 600,000 tons in the hands of our seller would give him enormous power. The sharp competition among the individual concerns would cease and the consolidated company would be in a position to make aggressive movements in distant markets in a very effective way.

As bearing upon the capacity of the Alabama furnaces to withstand the pressure of low prices, an interesting fact has been communicated to us by the manager of one of the leading concerns. Four years since the coke consumption was between 2 and 2¼ tons per ton of pig. Two years later it had been brought down to 1¾ to 2 tons, and now it ranges between 1½ and 1¼ tons per ton of iron. This in itself is a very creditable showing and has told, by making the net earnings of the last year, in spite of lower prices for iron, a little larger than they were during the preceding year.

The Birmingham iron makers, too, are going into the washing of coal, realizing that the outlay for improving the quality of their coke will be more than compensated for by decreased fuel consumption, more regular furnace working and a better quality of iron, reflected in an increased percentage of the higher grades.

Should the consolidation be effected, then the new concern may be expected to take hold vigorously of the question of finding an outlet for its pig iron product in the steel business. We have reason to believe that that would be regarded as the first field to enter, and it is not unlikely that the rail trade may be singled out for attack.

J. E. Mullen, trustee, has published a statement of the assets of the Alex. K. Rarig Company of Buena Vista, Va., the boiler-making firm which recently assigned for the benefit of its creditors. The assets are $240,158.52, consisting principally of real estate, including the works, valued at $115,000; machinery and tools inventoried at $78,378 23; merchandise on hand inventoried at $17.791.25, and $25,175 due on subscriptions to capital stock. The inventory is based on the present market value of the property, and is said to be 40 per cent. less than the prime cost of the company's property one year ago. The principal creditors and the amounts due them are given below:

Alex. K. Rarig	$15,344.71
Manning, Maxwell & Moore	14,754.17
Howe Scale Company	1,025.00
George Kinsey & Co.	1,365.70
Central Iron Works	1,756.10
Park Brothers & Co.	3,637.75

Notes have been given in settlement of accounts to George Kinsey & Co. for $1365.70; two to the Morgan Engineering Company, each for $3762.13; Consolidated Roofing Company, $2700; four to the Buena Vista Iron Company, aggregating $10,412.74, besides a number of smaller accounts. The company owe for labor $7741.74, making the total liabilities $86,099.27.

OBITUARY.

JOHN MERRY.

By the death, on February 18, of John Merry, of the galvanized sheet iron and metal firm bearing his name, at 535 and 547 West 15th street, N. Y. City, the trade loses an old and prominent manufacturing merchant. Mr. Merry was born February 27, 1827, at Bristol, England, and came to this country about 1843, first finding employment at Buffalo, N. Y., with a paint concern, but in a few years returned to this city and, with Col. Marshall Lefferts, introduced the first English galvanized sheet iron in this country in 1852. In the same year a galvanizing plant was established under the supervision of Mr. Merry, making him at his death the oldest galvanizer in the United States. Mr. Merry had three sons — William H., George E. and Henry C., W. H. and H. C. surviving him in the firm of Merry Brothers & Co. George E. was a partner with him as John Merry & Co. from 1885 until last October, when he retired from the firm to assume the management in a chemical company in Chicago in which he had become interested. In 1872 Mr. Merry and James E. Grannis established the West Side Galvanizing Works and did a flourishing business until 1877, when they were forced to assign by the failure of a Pittsburgh firm. In 1877 Mr. Merry joined with the late E. T. Hoopes in the firm of Hoopes & Merry, which continued until 1883, when Mr. Merry bought out his partner's interest and continued alone until 1885, when his son, George E. Merry, came into the firm, making it John Merry & Co., which style continued until his death.

RICHARD C. ROOT.

Supplee Hardware Company, Philadelphia, announce the death of Richard C. Root of pneumonia in that city, on Thursday morning, March 3. His illness was of short duration, and his many friends in the Hardware trade of New England and Philadelphia will be pained by the announcement of his death. The company bear testimony to his integrity as a man and his generosity and nobleness of heart, qualities which endeared him to them. Mr. Root's home was in New Haven, Conn.

A meeting of the members of the Ohio Coal Traffic Association of coal operators was held at the Monongahela House last week. J. M. Ferris of the Toledo and Ohio Central was chairman, and A. D. Smith of Columbia, Ohio, was secretary. The meeting was to agree on Lakes rates on coal for 1892. The rates agreed upon last year were 85 cents per ton on Ohio coal and 90 cents per ton from mines in the Pittsburgh district. The Pittsburgh operators claim that that basis has not been maintained and consequently they cannot compete with certain other districts. They ask that satisfactory rates be made as a basis and maintained. No action was taken at the meeting, but another meeting will be held in Pittsburgh on the 15th inst., when the subject will be again considered.

The Southwest Connellsville Coke Company have applied for a charter of incorporation. The incorporators are W. F. Cook, F. X. Barr, G. B. Bosworth and H. C. Guy. The two last named are prominently identified with the H. C. Frick Coke Company of Pittsburgh. It is stated that the new company will take hold of land in the Connellsville region which has heretofore been considered of little value and develop it.

HARDWARE.

Condition of Trade.

ORDERS ARE REPORTED by both manufacturers and jobbers as coming in more freely, and business on the whole shows a perceptible improvement. Travelers visiting smaller trade report a moderate but healthful business going on in most sections of the country, and an expectation on the part of retailers that the season's trade will be good. Orders are, however, placed with some caution, as there is no disposition on the part of the trade to purchase in anticipation of advances in price. The orders which are received by the manufacturers from leading jobbing houses also indicate a healthful business, as in some cases it is found necessary thus early to supplement orders placed a month or two ago. The indications thus point to a business of good volume, but there is as yet no evidence of any important recovery in the tone of the market, nearly all goods being held at very low prices and manufacturers' profits reduced to a minimum. There is comparatively little complaint in regard to collections.

Chicago.

(*By Telegraph.*)

The Hardware trade here steadily grows better, but would undoubtedly be much larger if the country roads were not in such wretched condition. The demand for staple goods is kept back for this reason, as outdoor work can only be prosecuted in a limited way. Shelf Hardware is quite active, with frequent sales of new stocks. The number of new Hardware firms starting up this spring in the West appears to be considerably larger than usual. The heavy Hardware trade is in good condition, some houses here having about as much business as they can well handle, although their facilities have been considerably increased within the past year. Collections are good.

St. Louis.

(*By Telegraph.*)

The Hardware trade shows signs of increasing activity. Of course complaint is still heard regarding the condition of the country roads, but this is expected at this season of the year. Barb Wire is selling quite freely, and prices are fairly well maintained. Wire Nails, on the contrary, are dull and weak. Fire Arms and Ammunition are also dull, while Building Tools have taken a sudden spurt. Staple goods are moving freely, and prices, while they are abnormally low in a great many lines, are to a certain extent well maintained. Collections, particularly from the West and Northwest, are reported as excellent.

Notes on Prices.

Cut Nails.—There is a fair but not heavy demand for Cut Nails, which the mills are able to take care of promptly, notwithstanding the fact that some large mills are not in operation and others have reduced their output. Prices continue without special variation and are on the basis of $1.45 for round lots at mill. This quotation applies to Iron or Steel Nails and is slightly shaded on desirable specifications. There is, however, a disposition on the part of some mills to stiffen their prices and to this extent the market shows a slight improvement. The regular price for small lots from store is $1.75, and for carload lots on dock sales agents are asking $1.65. The latter price can, however, be shaded by purchases direct from mills who have no representatives here.

Chicago, by Telegraph.—Cut Steel Nails are quiet, with manufacturers selling at $1.60 to $1.65, Chicago on 30-cent average, and jobbers quoting $1.70 from stock.

Wire Nails.—During the past week a fair business has been done in Wire Nails and the aggregate of orders received by the mills is considerable. The market in the matter of prices is in substantially the same condition as at our last report. The current price is $1.75 for carload lots at mill, but slight concessions are made, $1 70 being regarded as the lowest price which the manufacturers are willing to make. Small lots from store in New York are held at $2.

Chicago, by Telegraph.—Manufacturers appear to be maintaining prices close to the rates fixed at their recent meetings. Even rumors of lower prices are wanting. Their trade, however, is rather light at present. Jobbers quote $1.95 in a regular way from stock, but concessions are made, according to the character of the order. Carload lots are selling at $1.85.

Barb Wire.—There has been no quotable change in prices since our last review. There is some diversity in the quotations made by the mills in different localities and the market is not an entirely even one. The volume of business is larger. As a general quotation for carload lots of Four-Point Galvanized at mill $2.65 to $2.70 may be named. New York prices for local trade are on the basis of $3 10 for small lots of Four-Point Galvanized. Carload lots are 10 cents less.

Chicago, by Telegraph.—Barb Wire is reported in brisk demand by manufacturers, with carload prices quotable at $2.40 for Painted and $2.90 for Galvanized. Jobbers sell small lots from stock at $2.60 and $3.10 respectively. By a typographical error in last week's dispatch the difference between Painted and Galvanized Wire was mentioned as 40 cents per 100 pounds, instead of 50 cents, the correct figure.

Hollow Ware.—On their line of extra finished Hollow Ware Wagner Mfg. Company, Sidney, Ohio, quote a discount of 50 and 10 per cent., terms 60 days or 2 per cent. discount for cash in ten days. Freight is allowed on all shipments of 200 pounds or more.

Spooled Wire.—Tate & Co., Malden, Mass., announce the following revised prices on their Spooled Wire:

	Discount.
Tinned and annealed	60 and 5 %
Brass and copper	50 %

Glass.—The Glass market is still in an unsettled condition as regards prices. Inquiries are being received by jobbers looking to placing orders by large dealers, and some jobbers are making quotations at advanced prices. This in many cases results in the jobbers losing the order and keeping the Glass. How long they may feel justified in pursuing this course depends largely upon the future development of trade. Some Western factories report exceptionally large sales at an advance on the price ruling previous to the February meeting. There is a desire on the part of manufacturers and jobbers to create a strong market, and to this end they are exerting themselves. Demand at the present time is light and few are content to turn business away if they can see even a small margin. The revised price-list is still in abeyance, but will probably be submitted at the manufacturers' meeting. This does not necessarily assure its adoption at that time. Quotations are unchanged, as follows: American Window Glass, 1000-box lots or more, 80, 10 and 5 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount; French Window Glass, 75 and 10 per cent. discount; American Plate is held at a discount of 50, 10 and 5 per cent., and imported Plate at a discount of 60 per cent.

Important Barb-Wire Decision.

THE United States Supreme Court rendered a Barb-Wire decision on the 29th ult. which is of interest to very many members of the Hardware trade, and is given herewith substantially in full. Three cases had been appealed by the Washburn & Moen Mfg. Company from the Northern Iowa Circuit Court in which the validity of the Glidden patents was assailed.

Justice Brown read the opinion of the court, which says that while something like the fence was used prior to the date of the patent, the inventor made a success out of what had been a failure. As to the merit of the invention, the court believes there was a point that was patentable. The judgment of the court below was therefore reversed and the cases remanded for further hearing and accounting by defendants. The Washburn & Moen Mfg. Company having in the meantime disposed of their ownership of these patents to the Columbia Wire Company, the latter cor-

poration now becomes the beneficiary of this decided turn in Barb Wire affairs and will derive possibly immense pecuniary results.

The Barb-Wire patent litigation has always presented very peculiar phases. The situation now presented is no less remarkable than those which have previously turned up. All the Glidden patents have expired, the last of them having run out in November, 1891. This would seem to make the case just decided a barren victory for the Columbia Wire Company. But that is not the case, as they are now in a position to proceed against all manufacturers who have refused to pay the Washburn & Moen Mfg. Company or themselves a royalty, and, besides, what is of still more importance, to proceed against those who have in any way handled unlicensed Barb Wire in the past, including all classes of merchants. We are informed on the best authority that John R. Bennett of New York, the attorney for the company, is now engaged in preparing cases against all manufacturers who have infringed these patents. Some of the manufacturers who will thus be called upon for an accounting are now members of the Columbia Wire Company, which introduces another odd phase of this prickly question. If it should be decided to enter suit against the merchants who have handled unlicensed Barb Wire, to collect damages for which they are claimed to be liable, it is stated that the Chicago merchants will not be affected, as the jobbers of that city never dealt in anything but regularly licensed Wire.

The termination of the Barb-Wire litigation in favor of the owners of the patents is not unexpected to those who have kept close watch on the legal arguments presented as the cases progressed. All the Barb Wire manufacturers, however, were not in a position to do so, and hence many of them were for a long time of the opinion that the Glidden patents would not be sustained. The manner in which the Washburn & Moen Mfg. Company had been defeated in several of the lower courts had a strong effect in establishing this belief. The appeal to the Supreme Court, was, however, one of the items in the property acquired by the Columbia Wire Company, and they resolved to push it, and not drop it, although some of those interested in the company were inclined to let it rest because they feared a decision would not be reached until so long after the expiration of the patents that no benefit would accrue even if they won the suit. They have therefore been more fortunate than they expected.

The Columbia Wire Company now seem to be thoroughly intrenched in their ownership of the Barb-Wire business. The Glidden patents have expired, it is true, but other patents have yet some time to run, and, besides, the company own the patents covering, it is claimed, all the Barb-Wire machines of any value, no less than 164 in number. The small factories which have lately been springing up at various points have entered upon a path beset with thorns in the way of lawsuits.

Trade Items.

WE ARE ADVISED by Robert Schmerbeck, Kerrville, Texas, that for the last nine years he has represented Burger & Baumgard of New York in the State of Texas, a connection which will be severed on May 1, when he intends to open a wholesale and retail store at San Antonio, where he will carry a stock of Hardware, Stoves, Tinware, &c. Mr. Schmerbeck will be glad to receive catalogues and price-lists from manufacturers, addressed, until further notice, to Kewville, Texas.

D. B. FERGERSON has opened a store at Benton, Ky., and will carry Builders' Hardware, Farm Implements, Stoves and Tinware, Saddlery and Hames and Blacksmiths' Supplies. To this line it is not unlikely that he will add Buggies, Carts and Farm Wagons in the near future.

IN AN ITEM in our last issue relating to the sale of the entire stock of Stove Repairs and Patterns of E. C. Stearns & Co., Syracuse, N. Y., the name of the purchasers was erroneously given as Nieffer Bros. The correct style is Kieffer Bros., who are to be addressed as heretofore at Syracuse.

HULBERT BROS., 26 West Twenty-third street, New York, are putting on the market a Revolver designed to supply the demand for a lower priced pistol than their H. & A. folding hammer. It is a 38 caliber, 3½-inch barrel, of the hinge pattern, with cartridge ejector and regular hammer. One feature of the Revolver is the lightness of the frame. This is also made with a 5 inch barrel.

L. W. FERDINAND & CO., Boston, Mass., issue a circular in which their large assortment of Yacht, Boat, Canoe and Steam Launch fittings and supplies are referred to, together with their long experience in this class of goods. They remark that their catalogue of last year was so complete that it did not seem necessary to add anything to the line, so that there will be no changes in this year's edition.

THE COPARTNERSHIP heretofore existing under the name of Goodnow & Wightman, Boston, Mass., was dissolved March 1 by mutual consent. Luther H. Wightman having purchased the interest of Daniel Goodnow in the firm, will continue the business under the style of Goodnow & Wightman, at 68 Sudbury street.

REICHENBACH & WICKENHISER have bought the Hardware stock of F. Dick & Sons, Huntington, Ind., and will continue the business at the old stand. Mr. Reichenbach has been connected with the large Hardware store of John H. Kauke of Van Wert, Ohio, for 12 years, and for the last six years has had the entire management of it, and is a thorough Hardwareman. Mr. Wickenhiser is referred to as one of the well-known representatives of the McIntosh Huntington Company of Cleveland, and very familiar with the Hardware line. He will manage the new etsablishment.

THE TRADE WILL observe the advertisement signed "Good Faith" among the Special Notices in this issue The advertiser, who has had a good deal of experience in General and Builders' Hardware, Paints, Oils, &c., desires a connection with an established house as salesman or in other position. He is willing to invest a small amount as guarantee of good faith if desired.

DAVID COREY and Fowler A. Goodyear, administratois of estate of Leverett F. Goodyear, announce that they have sold the entire business, plant, machinery, tools, stock and good will of the East Rock Axle Works, formerly operated by the late Leverett F. Goodyear, to Willis E. Miller, proprietor of the Mount Carmel Axle Works (Ives & Miller). Mr. Miller will continue the business and retain Fowler A. Goodyear, who was superintendent of the East Rock Axle Works for many years, and Frank E. Field, the bookkeeper. The business of the Mount Carmel Axle Works, under the firm name of Ives & Miller, will be continued as heretofore.

UNDER DATE MARCH 1 it is announced that the Lamp & Miller Mfg. Company have become the successors of Peter Lamp & Co., Milwaukee, Wis. Peter Lamp is president and Fred. H. Miller secretary of the new company.

THE KEARNEY & FOOT COMPANY, 100 Reade street, New York, manufacturers of Files and Rasps, have received so many requests for their souvenir aluminum pocket match safes as to render it necessary for them to make a charge of 20 cents in postage stamps to cover part of the cost where parties write for them. They advise us that they will comply with all requests for boxes on this basis.

WIEBUSCH & HILGER, New York, sole agents for the new American Wrought Horseshoe Brand Anvils. These Anvils are referred to as being made of best American wrought iron, faced with the best crucible cast steel, the top and bottom being each one solid piece and welded at the waist. It is stated that the steel faces to these Anvils are all put on in one solid piece, not in two or more pieces. All Horseshoe Brand Anvils are warranted to be free from flaws and to have faces hard and true.

Louisville.

THE CONDITION of the Hardware market in Louisville is reflected in the following advices from a special correspondent in that city:

The Hardware trade of Louisville, Ky., resembles the type of Kentucky's prosperity, Blue Grass—it grows and grows, as the spring comes on. The jobbers had no idea there was so much pent up desire on the part of the retail trade and consumers, they were not looking for any such wild rush of orders, and the clerks and porters who have slowly killed time for months are actually beside themselves with heavy shipments. The demand continues for general Hardware, though agricultural implements still lead in present orders. One jobber here has just shipped out the last of the third carload of Plows received this spring; these goods have all gone into territory contiguous to Louisville. The good crops throughout this and adjacent States, except down in the cotton region, have enabled the farmers to make use of all the newest and best implements. The seed stores are also sending out more supplies than usual. Bar Iron remains firm from the mills, as there is apparently no overplus made to surfeit the market. The production of Sheet Iron also keeps within the demands of consumption. All the Barb-Wire mills are ready and willing to sell Wire, and are courting orders without actually cutting each other's throats. The Wire Nail mills would like a few big orders at recent advance in prices, and if they hold firm long enough will get them, but with all other Iron and Steel products so low they have uphill work to do. The Cut Nail men have a good opportunity to even up their prices a little, there being so few of the mills running, but any concerted action will probably never be attempted again. Many dealers assert that Cut Nails will soon be things of the past. It is a fact that in this city many houses handle three times as many Wire Nails as Cut Nails, whereas only a year ago the reverse was the fact.

CYCLES.

(*Continued from page* 431, *March* 3.)

HORTON, GILMORE, McWILLIAMS & CO., Chicago, have secured control for the coming season for the West of the sale of the Rival and Coventry Cross Cycles, manufactured by Warman & Hazlewood, Coventry, England. The frames are described as being of weldless steel tube, and all the connecting parts of dropped steel forgings. The spokes are of the best quality of mild steel; the rims are also of steel. It is stated that the balls are made by the makers of the wheels of the finest quality of silver steel, mathematically gauged to the $\frac{2}{1000}$ of an inch; after which they are carefully inspected under a strong magnifying glass for the detection of flaws. Any ball showing imperfection is destroyed. The Cycles are furnished with either $\frac{7}{8}$ solid, $1\frac{1}{4}$ cushion, or 2-inch pneumatic tires of the best Para rubber. The hand bars are of weldless steel tube, shaped in the style known to road scorchers as dropped. The plated parts are referred to as being thickly coated, while the other parts are finished in black glossy enamel, hard and perfectly smooth. It is stated that the saddle and spring are a combination so greatly in favor with American riders, the shape being the most modern and comfortable.

ELLIOTT HICKORY CYCLE COMPANY, Newton, Mass., referring to their new machine, the one which will be their leader, state that it will have a steel diamond frame, hickory wheels, fitted with solid cushion or pneumatic tires, as the buyer may prefer. It will have ball bearings all over, including pedals, and the special feature in this machine will be the forks and handle bar, which are referred to as particularly desirable. This machine will regularly be finished in enamel, with nickel trimmings, although when desired can be finished in natural wood. They will also have their natural wood machine, suitable for either lady or gentleman, which was brought out late last season. Their "100" machine has been improved, and can now be furnished fitted with either parallel or ball bearings. Their goods are disposed of almost entirely through the medium of agents, all over the country.

THE SWEETING CYCLE COMPANY, Philadelphia, Pa., refer to their line of imported Wheels for 1892 as being the finest and most complete that they have ever brought into this country. They include the Excelsiors, manufactured by Bayliss, Thomas & Co. of Coventry, England, and consist of three styles: A light roadster, fitted with 28-inch wheels, ball bearings throughout, cold drawn steel tube, drop steel forgings, finished in fine black enamel, striped with delicate, narrow blue lines, all bright parts nickeled on copper; weight all on, 36 pounds. The Lady's Excelsior is made and finished with the same material; it has a very long base, giving ample space for mounting, driving wheel is protected by a dress-guard of glazed leather laced to the frame, thus preventing all the rattle and inconvenience of a wire guard; weight, 37 pounds. Excelsior Full Roadster, being fitted with 30 inch wheels, having a base measurement of 48 inches, material and finish same as light roadster, and will not exceed 45 pounds in weight; on all of the above wheels the Garford saddle will be used and the wheels will be fitted with cushion and pneumatic tires.

They have been appointed distributing agents for the Quadrants, known throughout England and America for their durability, strength, neatness and speed. The manufacturers of the Quadrants have produced a diamond frame, it is stated, that without doubt is a marvel for strength and speed. The light roadsters, fitted with 28-inch steerer by 26-inch driving wheel, plunger brake, ball bearings throughout, and made in the very best grade of stock England produces; weight of which will not exceed 40 pounds all on. The Racer of same design will weigh 27 pounds. They will also handle the No. 17, a cross-frame, and No. 18, a lady's wheel, Quadrants, both of which are referred to as having had phenomenal success in this country for four years past.

It is stated that the Quadrant Cycle Company have, the past year, invented a spring-frame safety, which, having been thoroughly tested by expert riders, and acknowledged by them to ride easier than any pneumatic tire, they do not hesitate to include it in their line.

They also have their Belmont, which is referred to as having a true diamond frame, made of the very best weldless tube, drop forgings, and by expert workmen. It has ball bearings throughout, 28 inch wheels, racing handle bars, and finished in the best possible style. These wheels will be made with cushion and pneumatic tires. A year's guarantee goes with every machine.

Their Sweeting Diamond, which had a large sale last year, they have greatly improved by lengthening the wheel base, dropping the handle bars and finishing the same as their Belmont. They fit them with 30-inch wheels, $1\frac{1}{4}$-inch cushion tires, Garford saddles, also with pneumatic tires.

Their high-grade American wheel for the coming season will be the Phœnix, manufactured by the Stover Bicycle Mfg. Company of Freeport, Ill. This company's wheels they state that they have handled for the past three years with marked success.

THE COVENTRY MACHINISTS' COMPANY, Cheylesmore, England, and 239 Columbus avenue, Boston, intend to make their Swift machines for 1892 on the same lines and with the same finish as in 1891. They propose to fit their best machines with either the Swift, Dunlop or Thomas pneumatic tires. They expect, however, the chief demand will be for cushion-tired machines. Their new wheel for this season will be called the Holbein Swift. This machine, it is stated, will weigh complete 30 pounds actual. It is named after Mr. Holbein, who rode 361 miles 1446 yards in 24 hours on one of their light machines. The following is a list of their machines which will be furnished with either cushion or pneumatic tires: Holbein Swift; Models A, C and D; Ladies, and Ladies' No. 2.

At the end of last year, recognizing the increase of the Cycle business, this company decided to open a branch house at 11-13 Madison street, Chicago, Ill., with A. J. Marrett as its manager, to supply the Western part of the country. The two branch houses work in harmony, Mr. Hill of Boston appointing agents throughout the Eastern and Southern States and Mr. Marrett of Chicago throughout the Central and Western States. The Coventry Machinists' Company state that they have never catered for other trade than the very best throughout the 32 years' experience which they have had in Cycle manufacture. They have worked, it is added, on the principle that the best is none too good, which accounts for them not building any cheap grade Bicycles.

UNION CYCLE COMPANY, 166 to 170 Columbus avenue, Boston, Mass., issue an advance catalogue of their Cycles, which is to be followed by their annual catalogue. Illustrations are given of Union 2.10, Union Nos. 1, 2, 12 and 13, Sterling Safety and medium grade Bicycles.

The manufacturers state that the Union 2.10 is the outcome of a general demand for a lighter roadster Bicycle. It is referred to as having a frame of the diamond pattern, of the best English cold-drawn weldless steel tube, the connections being all drop forged and machined down to that point where lightness and abundant strength combine. The point is made that all brazing is carefully done by the gas process, which precludes the likelihood of the tubing being burnt. The wheels are: Front, 28-inch; rear, 27-inch; fitted with either cushion or pneumatic tires. The record of the Union cushion will be found by turning up the '91 Cottage City coasting contest, it is stated, when all the Unions beat every other make of wheel.

The pneumatic used will be either of the Thomas or the Tillinghast type, both of which have stood most exacting tests by themselves and the public at large. The bearings are referred to as being made with absolute accuracy, forming one of the strong points in Unions, and as being thoroughly under cover and dust proof. The balls, of which there are 156 in each machine, are $\frac{3}{16}$ to crank and rear wheel bearings and $\frac{3}{16}$ to front wheel, pedals and steering head. The steering head is 10 inches long and, it is claimed, will keep its adjustment twelve months with any rider.

The handle bar has a double curve and can be had with the curve upward or downward to suit the hight and requirements of the rider. The pedals supplied with the wheel will be of a neat rat-trap pattern unless otherwise ordered. It is stated that all parts are finished in first-class style, with durable enamel and nickel. The weight of the wheel *en deshabille* is 36 pounds, and with all parts on 41 pounds.

WARWICK CYCLE MFG. COMPANY, Springfield, Mass., will push their principal wheel, the coming new diamond pattern safety, with cushion and pneumatic tires. It has several improvements over last year's machine—namely, a longer frame, considerably longer steering head, new pattern of front fork with adjustable foot rests, a detatchable lamp bracket, and an entirely new and simple arrangement for adjusting the crank and head bearings.

They will also put on the market a light racing machine, weighing probably not over 26 pounds, fitted with pneumatic tires, which will bear the name of their last year's racing wheel, The Ghost. The manufacturers state that it will be in every way first class in its construction, and while exceedingly light, will be durable as a road machine for average-weight riders.

They will continue the manufacture of their ladies' machine, making it much the same pattern as that of last year. In regard to their method of selling wheels through general agents, they remark that they are not entirely wedded to this plan, and believe in the near future one of the best channels for the sale of Bicycles will be through the Hardware trade, as it is somewhat in their line, and as it can be carried on with little or no interference to their business. The point is made that the average Hardware merchant is a man that commands the respect of people generally, and is in a position to maintain a place that either ladies or gentlemen will at all times be glad to enter.

THE AMERICAN ORMONDE CYCLE COMPANY, 2081 and 2083 Seventh avenue, New York, are offering for the coming season the Ormonde Cycle, the front wheel of which is 30 inches and the rear one 28 inches in diameter. The spokes are fitted on the twin tangent principle, which insures rigidity and strength. The hubs are drop-forged steel, with the sprocket on the rear wheel, screwed to hub and further secured in place by three screws. The chain is referred to as being made of the best hardened roller pattern. The

newly designed girder crank, it is added, embodies great strength with lightness.

The frame, like the rest of the Ormonde, is described as made of weldless steel tubing and stampings; the lap joint system, it is stated, is used throughout its construction. The front forks have a crown of new design that permits the use of any width of tire. The point is made that the handle bars are placed to give a balance lift to the machine, while bringing the arms to a comfortable and natural position.

They also manufacture a ladies' wheel, equal in points of advantage to their men's machine. It is a double-drop frame, though somewhat lighter than the men's. The dress guards are made of closely woven wire, nickel-plated, and, it is stated, will fully protect the rider's habit. They are referred to as easy to mount and ride and as having all the embodiments of grace in every line. The weight of the Ormonde, model "C," is 40 pounds, all on. The ladies' Ormonde weighs 38

In addition to these machines the Ormonde Company will place on the market a wheel called the Salvator, fitted with cushion tire or with pneumatic tire.

The Clincher pneumatic tire used on the Ormonde wheels is described as follows: The tire has for its basis a rubber tube 1¼ inches in diameter placed on a specially constructed rim. The material of the tube is an alternate layer of rubber and linen in equal parts, and will stand a heavy air pressure. Over this is placed a band of like material. The rim is of rolled corrugated steel, with edges forming an angle, into which the outer rubber tube is fitted and retained in position by pressure of the air forced into the inner tube through a patent valve by means of a small air pump. It is added that the construction, while simple in looks, is so practical that bursting by expansion is well-nigh impossible. But in case the tire should be accidentally punctured, instructions are given to deflate it, which removes the pressure and, it is stated, allows a change in position of the outside band, and a sufficient amount of air is retained in the tube to permit any rider of ordinary weight to continue the use of his wheel. The point is made that this temporary relief, which is sufficient for the time, needs no mechanical knowledge and requires but a few moments.

KENWOOD MFG. COMPANY, 253 and 255 South Canal street, Chicago, emphasize the fact that they manufacture high-grade wheels, and that their claim is for quality and not cheapness. The Kenwood for 1892 is designed to fill the demand, the manufacturers say, "for a light diamond frame machine to suit the requirements of all-around riders. It is added that the peculiar construction of the frame gives ample strength to withstand the many different strains to which a Bicycle frame is subjected, and at the same time admits of a degree of lightness which is often absent in a general road machine. The wheels are referred to as being built strong and light, with tangent spokes, not wired, and as fitted with either pneumatic or cushion tires.

The Kenwood Ladies' Safety for 1892 is substantially the same as the Ladies' Special of 1891, being changed in such details as they have found possible to improve upon.

Kenwood Road Racer is similar to their regular diamond. It is stated that the frame embodies the same ideas of construction, but that it has more rake to the seat post, which, it is pointed out, places the saddle in the proper position for scorching.

The Kenwood Quadrant is the Kenwood Safety of last year, improved in minor details. This is retained in their line this season to fill the wants of those who desire a somewhat heavier machine than their diamond, for rough use.

The Kenwood Tricycle is referred to as a Tricycle of superior construction, which can at any time be changed with but little trouble to the regular ladies' safety. The lightness of this Tricycle is especially referred to, weighing, it is stated, but 50 pounds.

Price-Lists, Circulars, &c.

CHAMPION IRON COMPANY, Kenton, Ohio: Catalogue showing the Iron Fencing and other work which they are manufacturing. This catalogue is of large proportions, consisting of 240 pages, and is one of the finest yet issued in this line of business. Builders' Iron Work, Iron Posts, Chairs, Jails, Doors, Lamp Posts, Settees, Girders, Wrought-Iron Beams, Galvanized-Iron Work, Veranda Columns, Iron Stairways of all kinds, Iron Tree Guards, Malleable and Gray Iron Crestings, Lintels, Stable Fixtures, Weather Vanes, Cemetery Entrances, Fire Escapes, Vases, &c., are represented in it. An excellent view of their works at Kenton is also given. In the introductory notice to the trade the company state that with their increased facilities they are prepared to meet all demands, and call special attention to the style, finish and quality of their goods. The company issue three special catalogues besides the one referred to above, which is their general catalogue. These relate to Fence and Cresting, Structural Iron and Jails, the lines thus represented being embodied in the large catalogue. This company is one of the largest of its kind in the country. They have a number of departments, but each department is managed and controlled entirely independent of the other. They recently secured a contract in competition with England, France and Germany of a number of thousand feet of Fence and Entrances, to inclose the Queen's Palace at Honolulu, Hawaiian Islands. While this company have done a great deal of export business, yet this case is remarkable, having been taken under such strong competition.

THE J. D. SMITH FOUNDRY SUPPLY COMPANY, Cincinnati, Ohio: Foundry Facings, Blackings and Foundry Supplies, Plumbago and Black Lead. An artistic pen wiper is sent, in which blue, orange and white material is used, pinked about the edges, and held together by a neat bow. Upon the white and orange pieces is printed matter calling attention to their products. Small calendar sheets for 1892 are attached to the wiper, the whole forming a desirable addition to desk conveniences.

GAGE TOOL COMPANY, Vineland, N.J.: Self-Setting Planes. The company are distributing an advertising post office blotter, composed of three pieces of wood, the lower piece being oval, on which the blotting paper is secured. The top piece contains printed matter setting forth the advantages of their Self Setting Planes.

A. TREDWAY & SONS HARDWARE COMPANY, Dubuque, Iowa: Spring circular, 1892. A large assortment of seasonable goods, Washing Machines, Wrenches, Clevises, Padlocks, Door Bells, Curry Combs, Horse and other Brushes, Cutlery, Shears, Scissors, &c., are thus shown. The company call particular attention to their line of Agricultural Tools, which they state has been largely augmented.

THE JACOB HOFFMAN WAGON COMPANY, Cleveland, Ohio: Catalogue No. 26. This catalogue, while illustrating their general line of Wagons, gives special attention to their new Hoffman Delivery Wagon, the particular feature of which is that the body is hung very low. The wagon is also made with a footboard instead of a dash, thus making it easier to get in and out. The company also issue circulars relating to their Steel Mortar Hods and other specialties which they are putting on the market.

FLEXIFOLD DOOR AND SHUTTER COMPANY, 166 Devonshire street, Boston, Mass.: Catalogue illustrating the Flexifold Doors, Inside Blinds and Winding Doors and Partitions. Illustrations are also given of interior finish and cabinet work for the better class of buildings.

LEE-CLARKE-ANDREESEN HARDWARE COMPANY, Omaha, Neb.: Price current of Seasonable Hardware Specialties for spring, 1892. The current contains 36 pages, liberally illustrated with season goods, with which list prices are given. The company state that anticipating a heavy demand, they have made very large purchases of the choicest makes of goods, and that their stock in extent and variety is larger this season than ever.

H. K. PORTER, Boston, Mass.: The Boston Electric Wire cutter. This is an adaptation of the Easy Bolt Clipper, but is made to open wider, with handles heavily insulated with rubber. It is made both with and without automatic hook, for catching and holding the wire while being cut. The Cutter is particularly recommended for the use of fire and police departments.

SANDWICH ENTERPRISE COMPANY, Sandwich, Ill.: Ratchet Die Stocks, Improved Pipe Vise, Improved Float Valve, Champion Force Pump, &c. Illustrations are given of these goods under the common name of Enterprise. The above company also list Windmills, Pump Supplies, Hose, Tanks, Valves, Hydrants, &c. Accompanying the circulars is a discount sheet applying to Pumps and Pump Parts.

GENDRON IRON WHEEL COMPANY, Toledo, Ohio, and 107 Chambers street, New York: Bicycles and Cycle Supplies, Children's Carriages, Reed and Bamboo Furniture, &c. Separate catalogues are issued for each of these lines of goods, with illustrations and descriptions. These are accompanied by a supplement to the 1892 catalogue of Children's Carriages, on which special prices will be quoted upon application.

CHAMPION BLOWER AND FORGE CO., Lancaster, Pa.: 1892 catalogue of the Champion Lever and Crank Blowers, Power Blowers, Exhaust Fans, Portable Forges, Stationary Forges, Pulleys and Hangers, Screw Plates, Taps and Dies, Tire Benders and Shrinkers, Drill Presses, Tuyere Irons, &c. The company remark that their works are located in the midst of the iron and coal producing fields, and fitted up with all the latest improved machinery, especially built for their purpose.

THE MALLORY, WHEELER CO., New Haven, Conn., and 64 Reade street, New York: Appendix, 1892, to attach to their price list of October, 1891. This illustrates Anti-Friction Mortise Front Door Locks; Rose and Escutcheon combined; Store Door Handles, Door Knobs, Electric Push Buttons, Bell Pulls, Sliding Door Escutcheons, Mortise Store Door Locks, &c. A price list of these goods accompanies the appendix.

HERBRAND COMPANY, Fremont, Ohio: Catalogue of the Herbrand Gear Irons. These goods are illustrated, with information as to the sizes in which they are made and the particular uses for which they are designed. The manufacturers call special attention to their Fifth Wheel, which, they state, has been favorably known to the trade for many years. They also issue a circular relating to their Herbrand Body Loops and Walter Shaft Shackles.

BARB WIRE.

The Glidden Patent Sustained.

A DECISION of exceptional interest and importance was rendered February 29 by the Supreme Court of the United States. In it the validity of the Glidden patent was affirmed in the case of the Washburn & Moen Mfg. Company, appellants (the patent being now owned by Columbia Wire Company), *vs.* the Beat 'Em-All Barb Wire Company *et al.*, appellees. The case was appealed from the Circuit Court of the United States for the Southern District of Iowa. John R. Bennett of New York appeared for the appellants, and A. S. Blair, W. H. Singleton and D. B. Henderson for the appellees. This decision of the court of final resort thus terminates a long and varied litigation in regard to the patent in question. The importance of the decision and its bearings upon the trade are referred to in another column. Similar suits brought by the Washburn & Moen Mfg. Company against W. W. Norwood and also against John D. Wiler were consolidated in the court below with the suit against the Beat 'Em All Barb Wire Company, with the stipulation that the same decree upon the question of the validity and infringement of the patent declared upon should be entered in all causes. These suits differ only in the fact that they are brought against the venders of the infringing Wire instead of against the manufacturers. The court decided that as the causes are identical in every other particular the same disposition is to be made of them. The decree of the court below was accordingly reversed and the case remanded, with instructions to enter in each a decree for the plaintiffs for an accounting and for further proceedings in conformity with the decision of the court in the case of the Beat 'Em All Barb Wire Company. In view of the interest and importance of this decision we give it substantially in full:

This was a bill in equity for the infringement of letters patent No. 157,124, issued to Joseph F. Glidden, November 24, 1874, for an Improvement in Wire Fences. In his specification the patentee stated that "this invention has relation to means for preventing cattle from breaking through wire fences; and it consists in combining, with the twisted fence wires, a short transverse wire, coiled or bent at its central portion about one of the wire strands of the twist, with its free end projecting in opposite directions, the other wire strand serving to bind the spur wire firmly to its place and in position, with its spur ends perpendicular to the direction of the fence wire, lateral movement, as well as vibration, being prevented. It also consists in the construction and novel arrangement, in connection with such a twisted fence wire and its spur wires, connected and arranged as above described, of a twisting key or head piece passing through the fence post, carrying the ends of the fence wires, and serving, when the spurs become loose, to tighten the twist of the wires, and thus render them rigid and firm in position."

His claim was for "a twisted fence wire having the transverse spur wire D bent at its middle portion about one of the wire strands *a* of said fence wire, and clamped in position and place by the other wire strand *z*, twisted upon its fellow, substantially as specified." The following drawings accompanied the specification:

FIG. I

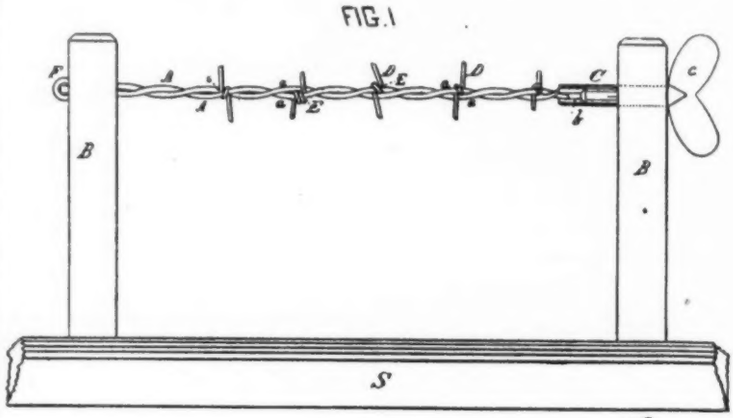
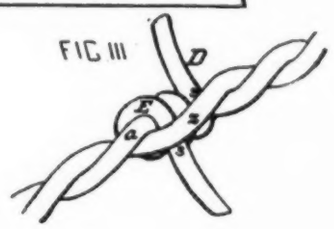


FIG. II

FIG. III



The Glidden Patent.

The bill also relied upon certain decrees obtained in other districts against other defendants, which were claimed to have established the valdity of the patent. The answer denied that, in view of the state of the art at the time this patent was issued, there was any invention in the device described, and averred that the decrees set forth in the bill were collusively and fraudulently obtained, and also set forth an opinion of the Circuit Court of the United States for the Northern District of Illinois to the effect that the patent was void for want of novelty.—Washburn & Moen Mfg. Company *vs.* Haish, 10 Biss. 65.

Mr. Justice Brown delivered the opinion of the court:

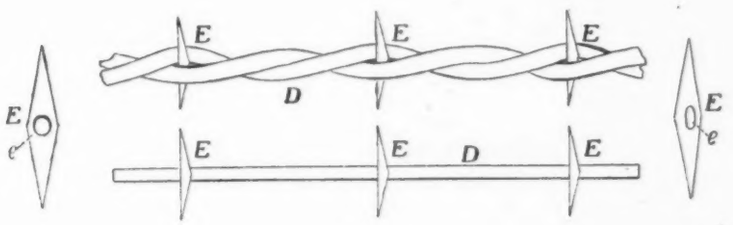
No serious question is or can be made regarding the infringment in this suit, the defendants relying solely upon the want of novelty. To determine satisfactorily the question whether there is involved in this device sufficient of novelty to support a patent, it is necessary to consider somewhat at length the progress which had been made in constructing barb-wire fences prior to the issue of this patent, as it appears both from the face of the prior patents themselves and from the oral evidence introduced by the defendants tending to show an unpatented use of such device before the application was made in this case.

1. The use of wire fences, composed either of a single wire, or two or more wires twisted together, antedates by many years the barbed feature of such fences. But, either by reason of their comparative invisibility or their weakness, they proved an insufficient protection against cattle, and fell largely into disuse. Something was needed, not so much to strengthen them, as to deter cattle from encountering them or testing their strength. Natural hedges of thorn, which in effect contain the principle of the barb wire, have been employed both in this country and in England from time immemorial. Fences of other materials and various forms had been armed with pickets, spurs, iron points, spikes, sharp stones or bits of broken glass inserted in plaster, but prior to 1867 no one seems to have conceived the idea of arming wire fences with a similar protecting device. In July of that year, however, one William D. Hunt took out a patent for arming the wires with a series of small spur wheels, their spurs being sharpened so as to prick readily. These wheels were provided with openings at their centers through which the wire passed, fitting it loosely, so that the wheel would revolve easily upon it. There was a provision sometimes used, and oftener not, for keeping the spurs in their places, and at suitable distance apart, by means of flanges. This was obviously a crude and unsatisfactory device, and never seems to have gone into general use. The spurs were small serrated wheels revolving loosely about a wire, aided by flat bits of metal to render them more readily visible, and kept in place, if at all, by a clumsy and expensive flange.

In the same year, and about four weeks before the patent to Hunt, although his actual invention was antedated by Hunt in point of time, Lucien B. Smith took out a patent for a wire fence having spools of iron or wood strung upon it, each spool being perforated and provided with four spurs projecting radially from them, and so arranged that they would revolve, while they were held in place lengthwise of the wires by slight bends or deflections in the wires at a distance of of 2 or 3 feet apart, forming short, straight lengths of about 4 inches, upon which the spools were hung. This patent contained the first suggestion of a barb proper, though in a very imperfect form; but it embodied an idea of which the public was not slow to avail itself, and gave an impetus to succeeding inventors, which finally resulted in the barb fence now in use. Though valuable as illustrating the state of the art, it will scarcely be claimed to be an anticipation of the Glidden device.

The patent of February 11, 1868, to Michael Kelly indicated a decided step in advance of its predecessors, consisting as it did of small flat pieces of iron or steel, cut from a plate by machinery, each provided with a hole correspondjng with the size of the wire, though a little larger, so that they could be introduced easily upon the wire, either by proper machinery or by hand. "These pieces," says the patentee, "after being strung on the wire at distances about 6 inches apart, are compressed laterally upon the wire by a blow

of a hammer, or otherwise, so as to flatten the hole *e* and also correspondingly flatten the wire at the point where this adjunct is to stand. I term these pieces 'thorns;' and it will be observed that each presents two sharp points. They may be so placed that they will all stand in the same plane; or they may stand irregular in many different planes. I prefer the latter arrangement. The wire thus provided with the sharp point or thorns serves in the ordinary manner, with the addition of possessing an offensive character, which will soon teach cattle to respect it and not attempt to force it." Fig. 2 of this patent, a representation of which is here given, undoubtedly contained the idea subsequently developed by Glidden, but there was apparently no method of holding the barb in place, save by a blow of a hammer—at least such seems to have been the opinion of the patentee at the time the patent was originally issued. He says of



The Kelly Patent.

this in his specification: "I can, where it is desirable to increase the strength of the wire, lay another wire of the same or a different size alongside of a thorn wire, and can twist the two together by any suitable mechanism." No claim was made for this method of construction in the original patent, although it seems to have been made the principal feature of a reissue obtained in 1876, which was not made an exhibit in this case.

In this reissue he made a claim for twisting two wires and a series of thorns strung upon one of the wires held in position by them. In the case of Washburn & Moen Mfg Company *vs.* Fuchs, 16 Fed Rep., 661, it was held that if this reissued patent were to be considered as covering more than the mode of fastening the plate barbs to the wire in the combination stated, *i. e.*, by hammering, and as extending the use of the twisted wire so as to include its use for the distribution and locking of all kinds of barbs, the reissue was invalid as to such extension, because it was not included within the scope of the original invention. It is evident from this that the use of the second twisted wire for the purpose of locking the thorn was not contemplated by the patentee at the time his patent was originally granted, but was an afterthought suggested by other devices which in the meantime had made their appearance.

A second patent to Kelly, issued November 17, 1868, exhibits a flat wire pierced at intervals of 6 inches, through which thorns were inserted and locked to the wire by the blow of a hammer or otherwise. This device evidently bears a much more distant resemblance to the Glidden patent than the prior one, and is far from being an anticipation.

The application for the patent in suit was filed October 27, 1873, though the patent was not issued until November 24, 1874. Subsequent to the application for this patent, and on March 14, 1874, Glidden filed an application for an improvement in wire stretchers for fences, upon which a patent was issued May 12, 1874. It is not perceived how this patent could affect in any way the pending application for the later patent. The patentee abandoned nothing he had claimed before, but sought as an improvement upon the former to claim a slotted tube midway between the posts, in which was put a coil spring to spread the wires and automatically tighten them and keep them at the proper tension as against expansion by heat and contraction by cold. If the later application had covered the same invention as the prior application for the November patent, the later patent might have been void under our ruling in Suffolk Company *vs.* Hayden, 3 Wall., 315; but his claim was for a combination of wires with the slotted tube, containing a coiled spring and perched upon a post. In this application he makes no mention whatever of barbs as a feature of his claim, although in describing his invention he mentions two wires provided at suitable intervals with spurs coiled around them, and which are spread apart between the coils to keep the latter from moving longitudinally upon the wires. But he says of these spurs: "I do not claim to have originated the devices known as 'spurs' or 'prongs' on the wires, they having been used before, but confine myself to the means for holding the spurs at proper intervals on the wires and to the means for attainining a uniform tension of the wires, as claimed." This disclaimer, it will be observed, is of spurs or prongs generally—not of the coiled barb either alone or in combination with the twisted wires—and is made with reference to that application only. It is true that this patent was subsequently reissued with a broadly expanded claim for a combination with a fence wire of a barb formed of a short piece of pointed wire, secured in place upon the fence wire by coiling between its ends, forming two projecting points; but this reissue was held to be unwarranted and void in Washburn & Moen Mfg. Company *vs.* Fuchs, 16 Fed. Rep., 661, 667. This attempted reissue, however, did not in any way affect his original application, which stood upon its own merits, and, after being rejected and amended three times, was finally passed, with a claim substantially identical with the first claim of the original application, and the patent granted. In legal effect this was a prior patent, since the date of the application and not the date of the patent controls in determining the legal effect to be given to two patents issued at different dates to the same inventor and the order in which they are to be considered. In any event, the reissue in 1876 of one patent would not affect another patent granted in 1874.

From this review of the state of the art at the time the patent in suit was issued it is evident that Glidden can neither claim broadly the use of the plain or twisted wire, nor the sharp thorns or barbs, nor indeed the combination of the two as they appear in the Kelly patent. It does not follow, however, that he did not make a valuable contribution to the art of wire fencing in the introduction of the coiled barb, in combination with the twisted wire, by which it is clamped and held in position. By this device the barb was prevented from turning or moving laterally and was held rigidly in place. It this be also true of the device shown in Fig. 2 of the Kelly patent of February 11, 1868, the immobility of the barb in that patent is due to the aid of a blow struck by a hammer, since the mere fact that the barbs were strung upon the wires would not of itself prevent a movement within certain limits unless they were held fast by compression. Indeed, it is obvious, as the patentee says, that the effect of the second wire is simply to increase the strength of the wire, and not, as in the Glidden patent, to hold the barb rigidly in place, though, of course, it would prevent its movement to any considerable extent in either direction. Al he says of it in connection is that "it tends to insure a regularity in the distribution of the points in many different directions." The vital difference in the two patents is in the shape of the barb itself. In one case a flat bit of metal is used of an elongated diamond shape, through which a hole is pierced by means of which it is strung upon the wire, requiring something more than the aid of a second wire twisted upon the first to render it immovable. In the other the barb is a piece of wire coiled about one of the fence wires, and held rigidly in place by the twisting of another wire about the first.

It is true that the affixing of barbs to a fence wire does not apparently give a wide scope to the ingenuity of the inventor; but from the crude device of Hunt to the perfected wire of Glidden, each patent has marked a step in the progress in the art. The difference between the Kelly fence and the Glidden fence is not a radical one, but slight as it may seem to be, it was apparently this which made the barbed wire fence a practical and commercial success. The inventions of Hunt and Smith appear to be scarcely more than tentative, and never to have gone into general use. The sales of the Kelly patent never seem to have exceeded 3000 tons per annum, while plaintiff's manufacture and sales of the Glidden device (substituting a sharp barb for a blunt one) rose rapidly from 50 tons in 1874 to 44,000 tons in 1886, while those of its licensees in 1887 reached the enormous amount of 173,000 tons. Indeed, one who has traveled upon the Western plains of this continent cannot have failed to notice the very large amount of territory inclosed by these fences which otherwise, owing to the great scarcity of wood, would have to be left unprotected.

Under such circumstances, courts have not been reluctant to sustain a patent to the man who has taken the final step which has turned a failure into a success. In the law of patents, it is the last step that wins. It may be strange that, considering the important results obtained by Kelly in his patent, it did not occur to him to substitute a coiled wire in place of the diamond shaped prong, but evidently it did not; and to the man to whom it did ought not to be denied the quality of inventor. There are many instances in the reported decisions of this court where a monopoly has been sustained in favor of the last of a series of inventors, all of whom were groping to obtain a certain result, which only the last one of the number seemed able to grasp. Conspicuous among these is the case of Loom Company *vs.* Higgins, 105 U. S., 580, 591, where an improvement in looms for weaving pile fabrics, consisting of such a new combination of known devices as to give to a loom the capacity of weaving 50 yards of carpet a day, when before it could only weave 40, was held to be patentable. It was said by the court, in answer to the argument that the combination was a mere aggregation of old and well-known devices, that "this argument would be sound if the combination claimed by Webster was an obvious one for attain-

ing the advantages proposed—one which would occur to any mechanic skilled in the art. But it is plain from the evidence, and from the very fact that it was not sooner adopted and used, that it did not, for years, occur in this light to even the most skillful persons. It may have been under their very eyes. they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value and to bring it into notice. . . . Now that it has succeeded, it may seem very plain to any one that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention."

So in Consolidated Valve Company *vs.* Crosby Valve Company, 113 U. S., 157, 179, it was said "that Richardson's invention brought to success what prior inventors had essayed and partly accomplished. He used some things which had been used before, but he added just that which was necessary to make the whole a practically valuable and economical apparatus. The fact that the known valves were not used, and the speedy and extensive adoption of Richardson's valve, are facts in harmony with the evidence that his valve contains just what the prior valves lack, and go to support the conclusion at which we have arrived on the question of novelty."

In Smith *vs.* Goodyear Dental Vulcanite Company, 93 U. S., 486, 495, it was said by the court: "We do not say the single fact that a device has gone into general use, and has displaced other devices which had previously been employed for analogous cases, establishes in all cases that the later device involves a patentable invention. It may, however, always be considered, and when the other facts in the case leave the question in doubt it is sufficient to turn the scale." See, also, Magowan *vs.* New York Belting Company, 141 U. S., 332, 343.

2. Thus far we have considered as bearing upon the state of the art, devices, the character, construction and scope of which were exactly defined in the specifications and drawings of actual patents, the only question presented being the proper interpretation of such patents, and the bounds they had set to the ingenuity of succeeding inventors. We have now to deal with certain unpatented devices claimed to be complete anticipations of this patent, the existence and use of which are proven only by oral testimony. In view of the unsatisfactory character of such testimony, arising from the forgetfulness of witnesses, their liability to mistakes, their proneness to recollect things as the party calling them would have them recollect them, aside from the temptation to actual perjury, courts have not only imposed upon defendants the burden of proving such devices, but have required that the proof shall be clear, satisfactory and beyond a reasonable doubt. Witnesses whose memories are prodded by the eagerness of interested parties to elicit testimony favorable to themselves are not usually to be depended upon for accurate information. The very fact, which courts as well as the public have not failed to recognize, that almost every important patent, from the cotton gin of Whitney to the one under consideration, has been attacked by the testimony of witnesses who imagined they had made similar discoveries long before the patentee had claimed to have invented his device, has tended to throw a certain amount of discredit upon that class of evidence, and to demand that it be subjected to the closest scrutiny. Indeed, the frequency with which testimony is tortured, or fabricated outright, to build up the defense of a prior use of the thing patented, goes far to justify the popular impression that the inventor may be treated as the lawful prey of the infringer. The doctrine was laid down by this court in Coffin *vs.* Ogden, 18 Wall, 120, 124, that "the burden of proof rests upon him," the defendant, "and every reasonable doubt should be resolved against him. If the thing were embryotic or incohate; if it rested in speculation or experiment; if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or invention which was completed while in the other case there was only progress, however near that progress may have approximated to the end in view." This case was subsequently cited with approval in Cantrell *vs.* Wollick, 117 U. S., 689, 696, and its principle has been repeatedly acted upon in the different circuits. Hitchcock *vs.* Tremaine, 9 Blatch, 550. Parham *vs.* American Buttonhole Machine Company, 4 Fisher, 468; American Bell Telephone Company *vs.* People's Telephone Company, 22 Fed. Rep., 309.

The testimony of the defendent tended to show the existence, public exhibition and use of a number of fences prior to the date of the application in this case; but what is known as the Morley fence is supported by the largest amount of evidence, and was the one the learned District Judge who heard this case in the court below held to have been an anticipation of this patent. (33 Fed. Rep., 261.)

A panel of this fence appears to have been exhibited at a county fair in Delaware County, Iowa, at Delhi, in 1858 and 1859. It appears that Morley owned lands in Delaware County; that his family lived in Pennsylvania; that for a number of years, from 1858 to 1864, he spent a portion of his time in Iowa, living alone or boarding with his neighbors; that he was not of entirely sound mind; and that he died in an insane asylum in Pennsylvania in 1867 after a year's immurement. It also appears that after 1861 the county fairs of Delaware County were held in Manchester, so that whatever was exhibited by Morley at Delhi preceded by several years the application for the Glidden patent. The testimony of the defendants tended to show, and we are indebted to the court below for an abstract of it, that, at the time the fair was being held at Delhi in 1858 and 1859, Morley came to the house of one Dubois, a farmer living in Delaware County, having with him a piece of fence wire, which had short pieces of wire wound around it; that Morley remained with him that night; that the next day he saw a panel of fence on the fair ground exhibited by Morley, made by stretching wires from a tree or post to another post; and that the wire so used was the same or similar to that previously shown him by Morley. One Bates, a blacksmith, swore that he aided Morley in putting up the panel of fence exhibited by him. He described the way the barbs were coiled around the fence wire, testifying that he made the tools with which the short wires were twisted around the fence wire, and describing the tools; and also that he afterward made a pair of shears for Morley, to be used in cutting the wire into pieces suitable for barbs. One Robinson, who acted as deputy marshal at the fair, testified that he rode a gray horse, and, having occasion to leave him, hitched him to a fence post in the fair grounds, and on his return found his nose and breast bloody, caused by a cut on his lip, and on examination found that the wires attached to the post had swags or barbs thereon, formed by coiling a short piece of wire arpund the fence wire. He also testified that in 1857 he was engaged in work on the railroad through Delaware County, near which Morley had a piece of land; that Morley was frequently where witness was working and tried to sell the land to him for a pair of mules, and that he had with him a piece of wire with swags on it, which he exhibited to witness, saying he was going to get it patented. There was other testimony to the effect that a boy, in playing wtth other boys ou the fair grounds, was thrown against the panel of fence and received two cuts, caused by the wires twisted upon the wire fence, which bled freely, and the scars of which were still visible upon his face. One Potter testified that he attended the fair and saw Morley there; that he exhibited a panel of fence made of wires strung between a tree and a post, with barbs made of short wires twisted around the plain wire; that Morley gave him a piece of the wire with barbs on it; that he took it home with him; that he and his wife talked about it and its effect upon stock; that he had the specimen of the wire in his summer kitchen for a year or more, and then put it in an old trunk in which he kept various relics and keepsakes; that it had remained there, and was there still; and then, on request of defendants' counsel, witness went to his home, brought the specimen of wire before the notary, and made it an exhibit in the case. It consists of a short piece of plain fence wire with two barbs on it, made by twisting other pieces of wire transversely around the fence wire. One Harrington also testified that he attended the fair; that he saw the panel of fence made of wire situated between a small tree and post, and there were barbs on it made of short wires twisted around the fence wire; that his attention was attracted to it by efforts that were made to drive a bull upon it, and that he examined the wire and noticed its construction.

In all some 24 witnesses were sworn on behalf of the defendants as to the existence of the Delhi fair fence. According to the recollection of some of the witnesses, it was made of three or four strands of single wire, on which the barbs were fastened, the wires being attached at their ends to posts in the ground, or to a post and a tree; and that the top wire had barbs on it, formed of short pieces of wire wrapped around it, some say once, others twice, and still others three times. The other two or three strands of single wire were without barbs. Beneath the top barb wire was a board to attract the attention of the cattle, either secured to the posts or suspended by a wire from the top wire strand. This fence was put up on the second day of the fair and exhibited one day, as it appears the fair continued but two days. No one seems to know what became of the panel, nor of the barbed wire upon it; it was never seen after the fair, beyond the single piece produced by the witness Potter.

Other witnesses sworn by the plaintiff, including the officers of the fair association and the editor of the local newspaper, were present at the fair, but have no recollection of anything of the kind. This, however, is purely negative testimony and of no great value.

It further appeared that in 1866 Morley took out a patent for a triangular cattle pen, built of posts and boards supported upon wheels, so constructed that it could be moved by the animal inside of it. Some seven or eight witnesses testified that at different times when they saw this machine it had on it one or more strands of fence wire with barbs or prickers on them, put on in the same manner as were the barbs on the Delhi fair exhibit, and the whole strung on the top of the posts above the boards.

Other witnesses testified to seeing fences upon farms owned or occupied by Morley, and in a yard near his mill, over which strands of barbed wire were stretched in the same manner as in the Delhi fence.

Upon the other hand, plaintiff met this testimony with that of a large number of witnesses who had seen these fences and also the cattle pen, and who testified that there was no barbed wire connected with them. The members of Morley's family, including his widow and sons, were also sworn and testified to the effect that he had never said anything about barbed wire or barbed wire fences, although it is but just to say that they remained in Pennsylvania and had never resided in Iowa. One of his sons testified that he visited Iowa once, in 1858, 1859 or 1860; and that he was at his father's mill for some time and saw no barbed wire about it, nor did he hear his father say anything about it. It is useless to go further into the details of this testimony.

Even conceding that Morley did exhibit a wire fence armed with barbs at the Delhi County fair, we do not think the testimony connected with this fence makes out a case of prior use of the device patented by Glidden, for the following reasons: 1. While the fence may have been armed with barbs, there is very little, if anything, to show that it was constructed according to the design of the Glidden fence. Indeed, after the lapse of 25 years it would, in the nature of things, be highly improbable that any witness who saw this fence for the single day it was exhibited there would be able to describe it accurately. 2. If Morley had regarded this fence as of any value he would have applied for a patent upon it, since he did in fact obtain a patent for his traveling pen, which appears to have been a comparatively worthless contrivance. If this pen had been armed with a barb wire it is somewhat singular that no allusion was made to it in the drawings or specifications. 3. The testimony of Potter, that he preserved a piece of wire given to him by Morley in a trunk containing some old relics for over 25 years, is not only contradicted by his son, who was familiar with the trunk, had examined its contents, and testified that he had never seen the wire there, but it is improbable upon its face. 4. If any experiments were made by Morley in this direction they were evidently looked upon by him and by the public as of no practical value, and were subsequently abandoned and the fences lost.

While we think the testimony goes far to establish the fact that Morley exhibited a wire fence at this fair, and perhaps also used it upon his farm at about the date claimed, we are far from being satisfied that it was the Glidden device, or so near an approximation to it as to justify us in holding that it was an anticipation.

Defendants also introduced testimony tending to show that one Long, a farmer of Delaware County, Iowa, made some barb wire fence in the spring and summer of 1873. He put the barbs upon smooth wire; made them out of staples, with two irons having holes in the end of each, running down into the irons from the ends longitudinally, of a little larger size than the staples to be used, and of the depth of the prongs of the staples. Two pieces of this barbed wire are produced as exhibits. It was not denied by the plaintiff that Long built a fence as claimed by him, and barbed his wire as described, but his evidence tended strongly to show that this occurred more than a year after the date fixed by him—*i. e.*, in 1874 or 1875, and after application had been made for the Glidden patent.

The most cogent evidence is that of the parties of whom Long appears to have purchased the lumber to build this fence, who swore that it was shipped in January, 1875, a statement which was verified by the bookkeeper in the employ of the Illinois Central Railroad, who showed the first shipment of lumber to Long to have been in January, 1875.

The existence of barbs upon what is known as the Chester D. Stone fence in 1871 is sworn to by a large number of witnesses, and denied by an equal number who were acquainted with the facts, and testified that it was an ordinary wire fence. Stone said it was made by using fence staples for barbs, putting them on by putting a staple astride of the wire, and hammering them on an iron wedge until the points passed one another, then placing the edge of the wedge between the points and driving on the head of the staple until the points of the staple were spread. The points stood out from the wire at right angles. All of the testimony bearing upon this fence, and of the others, with a single exception, it is sufficient to observe that it is limited to a staple twisted around a single wire to form a barb, and that it totally fails to indicate the combination of the twisted wires and coiled barb of the Glidden patent. The testimony with reference to the existence of this fence was subjected to a careful examination by Mr. Justice Brewer in the case against the Grinnell Wire Company, 24 Fed. Rep., 23, 29, who reached the conclusion that it was unworthy of belief. Upon the perusal of this testimony we are satisfied that his conclusion was correct.

The testimony with reference to the Hutchinson fence tends to show the existence of a barbed wire fence on a farm near Manchester as early as 1868 or 1869. The depositions of four members of the same family were taken, one of whom did the work in putting the barbs upon the fence. He swears "it was a fence with posts and wires strung along them, like the old plain wire fence used to be. The barbs were a piece of wire, as I remember them now, like a staple, sharp at each end. We put them on with a pair of pincers, larger and heavier, but similar to those used in ringing hogs." The staples, it seems, were purchased in Manchester, and the witness found it impossible to set them hard enough upon the smooth wire to prevent their turning. A piece of this barbed wire was an exhibit in the case, and shows a single wire with pointed barb, also of wire, wound once around it. Indeed, all the testimony indicates that the barbs were placed upon a single wire, and that no attempt was made to hold them in place by twisting a second wire about it. The conclusive answer to this testimony, however, is that both the barbs and pincers were purchased of one Butler, a merchant of Manchester, and it is proven by him and his clerks that he had none of this size for sale until 1877, and that none could be bought at any hardware store in Manchester.

Some six witnesses were called by the defendant to establish the existence of a barbed wire on a fence between 1857 and 1860 upon the farm of one Beers, near De Kalb, in Illinois. The testimony showed it to be a single wire with barbs on it, forming part of a fence around a hay stack. The barb was first twisted around and then extended along the wire possibly ½ inch to 1 inch, and then twisted again in the same way. Another wire forming part of a fence upon the same farm seems to have been composed of two wires, the barb being fastened to one of them. Another witness describes the fence as "two wires twisted around, and there was another piece of wire, I should judge, about 6 inches in length, twisted around this wire, and one end projected one way and the other end the other." It appears that the prior use of this wire was set up in a case by these same plaintiffs against one Haish in the Circuit Court for the Northern District of Illinois, 10 Bissell, 65, and was held to have been insufficiently proved. A specimen of the twisted wire produced in that suit was also put in evidence in this. It is very improbable that it could have been invented by a boy in his early teens, such as Beers then was, and it is shown that he subsequently took out a license under the Glidden patent after being defeated in a suit brought against Haish for the infringement of this patent, in which his device is set up as an anticipation. The testimony also indicates that the exhibit is constructed of a variety of steel which did not come into use until 1870. Upon the whole, the evidence fails to satisfy us that this fence was constructed before application was made for the Glidden patent.

There was a vast amount of testimony of similar character tending to show the use of coiled barbs upon fence wires, which it would serve no good purpose to discuss in detail. There was evidently prior to Glidden's application more or less experimenting in a rude way in about Delaware County, upon the subject of barbed wires as applied to wire fences, and we think it is quite probable that coiled barbs were affixed to single wires before the Glidden application was made. We are not satisfied, however, that he was not the originator of the combination claimed by him of the coiled barb, locked and held in place by the intertwisted wire. It is possible that we are mistaken in this; that some one of these experimenters may have in a crude way hit upon the exact device patented by Glidden, although we are not satisfied from this testimony, whether or by whom it was done. It is quite evident, too, that all or nearly all these experiments were subsequently abandoned. But it was Glidden, beyond question, who first published this device; put it upon record; made use of it for a practical purpose; and gave it to the public, by which it was eagerly seized upon, and spread until there is scarcely a cattle-raising district in the world in which it is not extensively employed. Under these circumstances, we think the doubts we entertain concerning the actual invention of this device should be resolved in favor of the patentee.

The decree of the Circuit Court will, therefore, be reversed, and the case remanded with instructions to enter a decree for the plaintiff for an accotnting, and for further proceedings in conformity with this opinion.

Mr. Justice Field dissented upon the ground that there was no novelty in the invention.

It Is Reported—

That John W. Williams, Springfield, Mo., is preparing to build a large block, which will be occupied by his Hardware business.

That J. W. Shoemaker is building an addition to his Hardware store at Ruffsburg, Ind.

That J. T. Smith, South Superior, Wis., will soon resume his old business and open a Hardware store.

That the Hardware firm of Ingersoll, Whitman & Co., Auburn, Maine, has been dissolved. The business has been purchased by James Elms and Calvin Hall, who will conduct it hereafter under the firm name of Hall & Elms. Mr. Elms has for a long time been employed in the store of George B. Brooks of Auburn, and also in the establishment of Hall, Knight & Co. of Lewiston.

That S. J. Kennerly has opened a retail Hardware store at Palatka, Fla.

That R. H. Allen, Sac City, Iowa, has sold his Hardware and furniture store to C. N. McCarty.

That Fred. Owen has purchased George Damerek's interest in the Hardware business at Grand Forks, N. D.

That Aaron W. Tobin of Brick Chapel, Ind., has purchased an interest in B. F. Barwick's Hardware store at Greencastle, Ind.

That R. Edmonds & Son, Warren, Pa., are moving their Hardware stock to the store lately occupied by the Keystone Clothing Company.

That P. Reilly, Livermore, Iowa, has purchased the Hardware store lately owned by J. W. Leighton.

That E. W. Lowell, Janesville, Wis., dealer in Hardware, will remove his stock to new quarters in a few weeks.

That J. W. Poor has purchased the stock of Hardware of M. B. Maxson, Marvin, S. D., and will continue the business.

That Redinger & Opdyke's Hardware store at Ridgeway, Mo., was burned out on the 15th ult.

That S. T. Moles has resigned his position as manager of the Chapin-Wells Hardware Company, Duluth, Minn. Mr. Moles has held this position ever since the company started in business at Duluth.

Exports.

PER BARK MARY HASBROUCK, FEBRUARY 10, 1892, FOR WELLINGTON.

By Arkell & Douglas.—1 case Bolts, 15 cases Hardware, 1 bundle Cordage, 5 dozen Tools, 2 dozen Wringers, 18 dozen Churns, 2 dozen Mangles.
By Edward Miller & Co.—35 packages Lamp Goods.
By the Goulds Mfg. Company.—2 cases and 2 hogsheads Pumps.
By Collins & Co.—12 dozen Picks.
By S. Hoffnung & Co.—4 packages Lamp Goods.
By A. Field & Co.—1 case Washing Machines.
By the F. B. Wheeler Company.—11 packages Tinware, 14 cases Hardware, 1 case and 2 crates Hardware.
By R. W. Forbes & Son.—3 cases Scales, 3 crates Shellers, 4 cases Guns and Cartridges, 65 cases Axes, 2 cases Picks, 1 box Lampware, 150 cases Axes, 15 cases Axes, 2 cases Hammers, 10 boxes Axes, 7 packages Hardware, 3 cases Horse Nails, 8 packages Hardware, 8 packages Hardware, 12 cases Horse Nails, 5 cases Wringers, 23 packages Lawn Mowers, 19 packages Hardware, 5 cases Horse Nails, 7 packages Hardware, 7 cases Axes, 5 cases Wringers, 5 packages Lampware, 48 packages Hardware.
By McLean Bros. & Rigg.—2 cases Hay Forks, 8 cases Wringers, 30 dozen Axes, 27 dozen Lampware, 9 cases Saws, 1 case Broilers, 3 cases Locks, 2 cases Garden Rakes, 2 packages Blocks, 2 cases Wringers, 2 cases Mattocks, 6 cases Axes, 4 cases Horse Nails, 5 cases Saws, 10 cases Axes, 3 cases Hardware, 3 cases Lawn Mowers, 1 crate Air Guns.

PER BARK LILLIAN, FEBRUARY 24, 1892, FOR PORT ELIZABETH, SOUTH AFRICA.

By the Goulds Mfg. Company.—4 cases Pumps.
By Corner Bros. & Co.—46 cases Tools, 277 cases Agricultural Implements
By William E. Peck.—1 case Balances.
By R. W. Forbes & Son.—2 cases Hardware, 2 boxes Axes, 1 case Gong Bells.
By Norton & Son.—12 kegs Corn Shellers.
By W. H. Crossman & Bro.—124 cases Hardware, 315 cases Agricultural Implements and Parts, 10 crates Stove Polish, 10 kegs Nails, 15,000 Cartridges, 300 reels Barb Wire, 72 bundles Tools.
By Coombs, Crosby & Eddy.—40 kegs Nails, 9 cases Plows.
By Norton & Son.—50 kegs Nails, 2 cases Pumps, 25 cases Hatchets, 75 cases Plows.
By Henry W. Peabody & Co.—7 crates Farming Implements, 24 packages Corn Shellers, 2 packages Hardware, 5 cases Pumps, 1 case Fuses.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

That there is still room for considerable improvement in the distribution of various lines of Paints and Colors is admitted by most manufacturers and jobbers. As a matter of fact, the complaint is made in some quarters that business continues disappointly slow considering the near approach of the spring season, when the spreading of Paint should show some sign of increasing if it is to increase at all beyond ordinary bounds. However, the gratifying fact is to be noted that the general movement has been on a larger scale the past week than it was during the one immediately preceding and that negotiations have been entered into for certain specialties that promise favorably to result in good sized contracts being closed ere long. That White Lead will be no cheaper in the immediate future seems to be a foregone conclusion, and surface indications are that Linseed Oil is more likely to advance than to depreciate in value. In the condition of the market for other base materials there is nothing suggestive of lower cost, and as manufacturers' prices are at present on a level with lowest cost in several years there would appear to be no reason for buyers to observe more than ordinary caution. As far as prices are concerned, buyers have some unusual advantages at the present time, and, with all due allowance for adverse influences of one kind or other, it seems hardly probable that requirements during the season coming on will be below the average.

White Lead.—The familiar report, "nothing new," has again been the most conspicuous one regarding the market for this pigment. In some quarters it was stated that sales of both pure Carbonate and mixed Leads have been larger than during the preceding week, but such experience would merely be in the natural order of things, and the only deviation from routine reports is in the remark of some sellers to the effect that distribution has not been up to expectations. In corroders' product there is not sufficient competition to affect prices, and in mixed Leads the current business is almost exclusively at figures that have ruled for three or four weeks past, which would indicate upon the whole a fairly steady general market.

Litharge, Red Lead, &c.—Not the slightest change is apparent in the market for Litharge or Red Lead. Business expands somewhat as the season of heaviest consumption advances, but the improvement in sales is not above the average for this period of the year and prices remain stationary. In Orange Mineral there is more doing, but nothing occurs that would bring about any radical change in prices of either domestic or foreign varieties.

Zincs.—For American brands there continues to be a good, steady demand and free movement of supplies in delivery on old orders. Foreign product is represented as being in very fair demand also. Base material is plentiful and comparatively cheap on both sides of the Atlantic, but the former line of prices for both domestic and foreign Oxide is adhered to.

Colors.—On Dry Colors there is really nothing to note save that sales of the more staple varieties are of slightly better volume than they were a fortnight ago. Prices are stationary on first-class goods, and in the instance of inferior kinds show nothing more than ordinary fluctuations. Oil Colors meet with uneven sale, but the first effects of the competition of the National Lead Company are wearing off, and business is now proceeding in about the usual way.

Miscellaneous.—Block Chalk from steamer has been sold at $1.50, and even less, against $1.87½ @ $1.90 quoted for sail shipment, and the market is weak. Whiting is somewhat weak under the influence of the present low cost of material, with 35¢ now a common price for "commercial" quality, and the better grades selling at corresponding figures. The Putty market is without change.

Oils and Turpentine.

The market for Animal and Vegetable Oils is without distinctively new feature. No further progress in the direction of establishing higher prices for Linseed Oil has been made, nor have the several adverse influences bearing upon Cotton-Seed products led to anything in the nature of serious depression in that line, although still threatening. As for other Oils, there is nothing to say except that distribution has been of strictly rountine character and at former prices. Export buyers are extremely backward, claiming that prices are relatively lower in the foreign markets than on this side of the Atlantic, and, in the absence of incentive for pursuing a different course the home trade buy only as imperative wants dictate.

Cotton-Seed Oils.—Purchases for foreign account have been moderate, despite the fact that ocean freight rates from this port are lower and business on home account has continued narrow. This condition of affairs tends to give the market a weak appearance, but the unfavorable features are offset in a good measure by moderate movement of supplies to this point, and at the utmost buyers cannot claim to have gained more than ⅛¢ advantage in prices. Business has been chiefly on the basis of 25¢ for prime crude and 29¢ for prime Summer Yellow. The exports thus far this season amount to about 8,170,000 gallons, against 8,930,000 gallons during the corresponding period last year.

Linseed Oils.—There has been no positive change. In quarters where Western and other out-of-town product is handled the talk is very much the same as it was a week ago, with more or less display of confidence in better prices, but on actual business it does not appear that a better price than 35¢ has been reached, while buyers intimate broadly that carload lots have been sold or offered at 34¢ during the past few days for near future delivery. City crushers have made no change in their prices, and report that sales increase as the spring season advances to an extent sufficient to show that their product still holds its own in competition with out-of-town product. The cost of raw material continues comparatively high, although more or less irregular. Rumors have circulation that Western crushers have come to an agreement.

Lard Oil.—There continues to be a good, steady demand in this and other markets that closely absorbs the production of prime Oil, and, in the absence of any radical change in cost of raw material, prices remain steady. The lower grades are also holding their own in price and meeting with fair sale.

Miscellaneous.—Olive Oil in barrels has met with very fair sale, and the market is steadier, with 62¢ @ 65¢ obtained for parcels on the spot and 57¢ @ 58¢ for future shipments. Cocoanut Oils have remained steady in price, and found fairly good sale. Neatsfoot Oil is stronger, with more or less advance on late prices generally asked. Mineral Oils are moving in a routine way only and at practically former prices.

Spirits Turpentine.—The speculative interest that was conspicuous last week and the week before has subsided. Supplies here and at some of the Southern ports have increased, although not to an extent bringing the supply above the average for the season. Prices have dropped about 2½¢, or to 39½¢ for regular and 40¢ for machine barrels. During the past few days there have been sales at as low as 37½¢ from second hands and the market at the close was very irregular.

H. C. Frick and Andrew Carnegie, with a party of steel and coke men, are examining the coal fields of old Mexico. They will return by way of California, which will be reached by steamer.

Thompson's Universal Truck.

Thompson Mfg. Company, Elkhart, Ind., are introducing this article, as shown in Fig. 1. These trucks go in pairs, and are provided with handles for convenience in moving from place to place when not in use. The wheels are 8¼ inches in diameter, and are designed to carry any weight up to 4000 pounds. It will be seen that the lower part of the hanger has sharp points, which are forced into the bottom of the case by its own weight, so the trucks are held in place and, it is stated, will not become detached when the wheels are forced over obstructions.

Fig. 1.—Thompson's Universal Truck.

The application of the truck is shown in Fig. 2. In loading, the operator stands at the side of the case and forces his weight against it sufficiently to tip it enough to place the first truck under about the center. This will raise the case off the floor enough for him to get under it with a bar and raise the other side so as to get the second truck under, should the case be heavy enough to require the use of a bar. It is recommended for use in freight houses, storage buildings, warehouses, docks, and as useful in moving pianos, organs, folding beds, crated stoves, crated carriages, boxes, &c. The point is made that they will fit any case, large or small, wide or narrow; that they take up practically no room when not in use, and that one man can handle almost anything alone on these trucks.

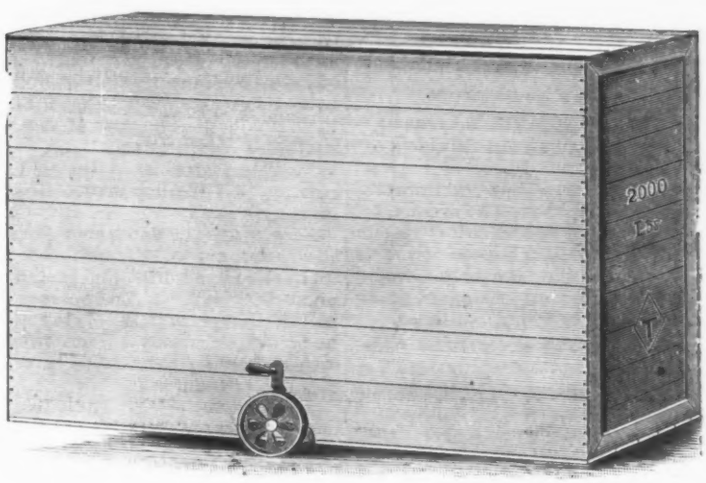


Fig. 2.—Application of Thompson's Universal Truck.

House Force Pump.

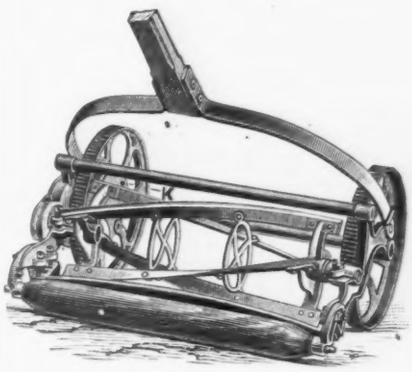
F. E. Myers & Bro., Ashland, Ohio, are placing on the market a house sink force pump, as illustrated herewith, which is constructed on the same plan and the same patents as their fruit tree spray pump, which, it is stated, has given very general satisfaction. The pump is described as having a brass plunger cylinder with expansive rubber plunger bucket, the lower cylinder being either polished iron or brass lined, as desired. It is referred to as having steel pins in the fulcrum bearings, good leverage, a large air chamber, and as discharging an even, continuous stream of water. It is furnished with hose attachment. It is built in harmony with the submerged cylinder pump patents; and, it is added, is neat in design and compact in construction.

House Force Pump.

Paine, Diehl & Co., Philadelphia, Pa., refer to their Won't Pack Salt Shake as not simply a salt shaker, but that it shakes out the salt. The dasher can be turned from the outside, so that the damp salt can be stirred up and broken, at the same time scraping clean the holes. This is but a moment's work, no matter what the condition of the salt may be.

Philadelphia Lawn Mower—Style A.

Graham, Emlen & Passmore, 631 Market street, Philadelphia, Pa., are offering this machine, as illustrated herewith. It was designed to furnish a high-wheel mower of light weight that would not only be no heavier than the ordinary machines, but much stronger. This they state they have accomplished by making the frame and wheels of the best malleable steel and simplifying the gearing. The axle turns with the wheels, and one of the wheels is keyed fast to the shaft to prevent the wear causing them to wabble and catch the knives, or to rub against the sides. The smallest cog wheel is 2¼ inches in diameter, and the revolving cutter is 6½ inches in diameter, with driving wheels 10 inches in diameter. The stationary knife has two set screws at each end for adjusting it, and the journals of the revolving cutter are provided with set screws for taking up the wear. The brackets that hold the wood roller are adjustable so that the roller may be raised or lowered, as desired. It has been the aim of the manufacturers to make the mower perfect in every respect, and they state that it has every improvement that their experience in the manufacture and sale of over 325,000 machines prompts them to think can be of the least value. These are made in two sizes: 17-inch, weighing 42 pounds, and 19-inch, weighing 44 pounds.



Philadelphia Lawn Mower—Style A.

Stone Fork.

Iowa Farming Tool Company, Fort Madison, Iowa, are putting on the market the fork illustrated herewith. This fork is intended for handling broken and cobble stone, coal, cinders, phosphate, cotton seed, &c. It is made in eight tine 4½-foot and D handles, and ten tine 4½-foot and D handles, all with strap ferrules.

Stone Fork.

The size of the body of the eight tine fork is about 9½ by 12½ inches, and of the ten tine about 12 by 13½ inches.

Triumph Belt Shipper.

Peter A. Frasse & Co., 95 Fulton street, New York, are offering this article, the application of which is shown in Fig. 1. The construction of the shipper is shown in Fig. 2, being strips of parallel metal fastened at the lower end to a wood handle, and to the upper end of which is attached the roller. The expanding radial head, Figs. 3 and 4, is an important feature of the device, as it allows the roller which is passing under the belt to pass around the pulley without the necessity of the operator as he stands on the floor changing the position of the handle. The belt is raised from the shaft on the roller and placed on the pulley while it is in motion. The head of the shipper is drawn out by the pulley in the act of shipping the belt. As shown in Fig. 2, the plates on the roller are to prevent the belt from slipping off. Different length rods are provided for use with various widths of belts, and the fittings may be adjusted to suit either hand by reversing the rod. The point is made that the danger resulting from the use of ladders and from putting belts on pulleys with the hands or with sticks is entirely obviated by the use of the shipper. The Triumph is made for pulleys up to 40 inches in diameter, with a handle 6 feet long.

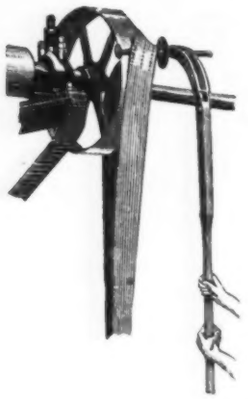


Fig. 1.—Triumph Belt Shipper.

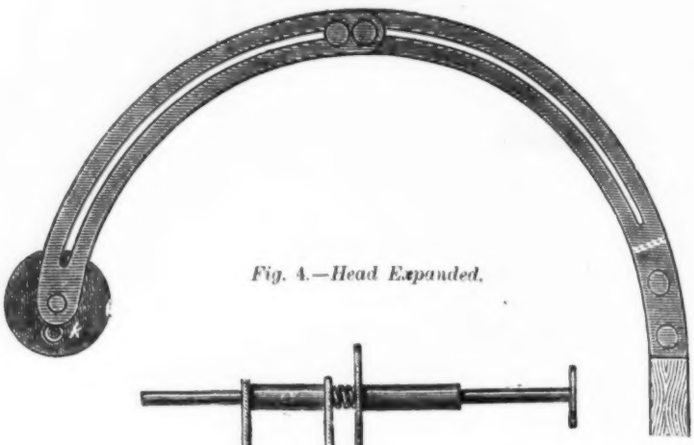


Fig. 4.—Head Expanded.

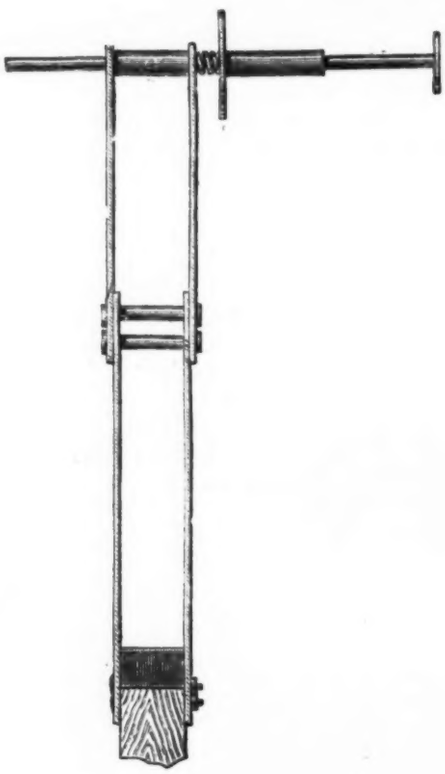


Fig. 2.—Construction of Shipper.

Fig. 3.—Unexpanded Head.

The Simplex Glass Tube Cutter.

The Simplex Glass Tube Cutter.

This article is manufactured by Pancoast & Maule, 243 and 245 South Third street, Philadelphia, and is illustrated herewith. The mode of operating the cutter is as follows: Place the tube to be cut on a table or other level surface, insert the rod and bring the wheel in contact with the glass. Bear down slightly on the tool and at the same time impart a rotary motion to the tube with the palm of the left hand. The cutter wheel will then mark a perfect circle on the inner surface of the tube, and a gentle tap will cause it to break off with a clean, smooth fracture. The very low price at which this article is sold is referred to by the manufacturers, as well as the effectiveness of its operation. The cutter is packed in boxes containing one dozen, each tool being packed separately in a smaller box.

The Orr & Lockett Hardware Company of Chicago have recently secured a number of very important contracts for furnishing the hardware for large office buildings now being completed in that city. They may be enumerated as follows: The Chicago Title and Trust Company's building, 16 stories high, the hardware for which is to be of special design in Bower-Barff finish. The Women's Temple, 14 stories, in regular hardware, of bronze antique copper finish. The Venetian Building, 16 stories, hardware of special design, the first floor to be of aluminum and the other stories of bronze antique copper, but all of the same design. The Ashland Building, 16 stories, hardware of special design, Bower-Barff finish. The Unity Building, 16 stories, hardware of special design, silver plated. The firm state that the reputation which they have established for handling this class of work with the most satisfactory results to contractors and owners has latterly brought to them orders which have been submitted without the solicitation of competing bids and with no preferences expressed as to the manufacturer. The same company have

been awarded a contract for furnishing the Monadnock and Kearsarge buildings, 16 stories high, with the Skidmore patent balcony for protection in cleaning the windows. The appliances will be fitted to every window in these immense structures.

Walker's Hand Corkscrews.

Erie Specialty Mfg. Company, Erie, Pa,, have recently added to their assortment the line of corkscrews represented in the accompanying illustrations, Figs. 1,

Walker's Hand Corkscrews.—Fig. 1.—No. 1 Corkscrew.

2 and 3. These extractors are described as made of the best tempered steel, finely finished. The screws are securely fastened in the handles, so that they cannot, it is claimed, work loose or pull out. The screw shown in Fig. 1 is nickel plated and has a loose head to fit the top of a bottle.

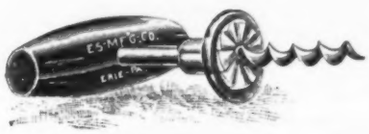


Fig. 2.—No. 2 Corkscrew.

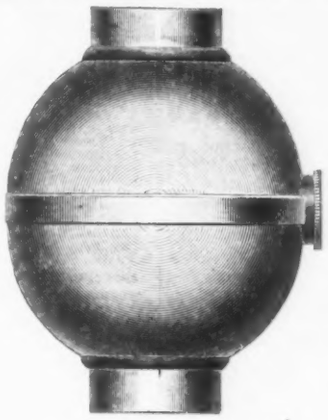
In drawing the cork the puller is screwed down until the cork is drawn up into the head as far as it will go, when turning the extractor and pulling slightly, the cork is withdrawn. Fig. 2 also represents a nickel-plated screw, with a solid

Fig. 3.—No. 3 Corkscrew.

fluted head that grips the cork. Fig. 3 illustrates a strong, substantial screw, which is intended for general use.

The Williams Reversible Water Filter.

H. A. Williams Mfg. Company, 332-336 Congress street, Boston, and 55 Fulton street, New York, are offering a filter, as

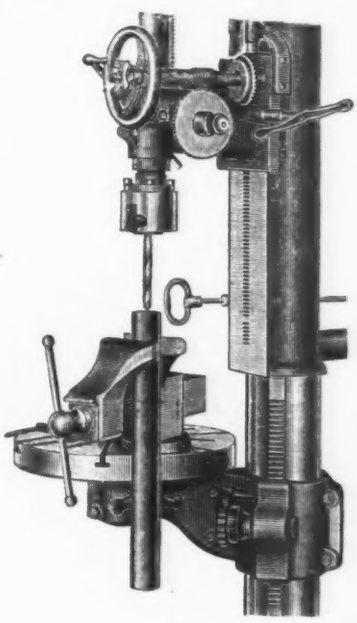


The Williams Reversible Water Filter.

illustrated herewith. It is made of heavy brass and is provided with a thread at both ends for screwing into a faucet. It is filled with quartz filtering material, held in place by woven phosphor-bronze wire screen fastened inside near either end. The quartz can be readily removed for cleansing by unscrewing the side screw cap, and the filter easily reversed on the faucet without the use of tools. The filter is 2¾ inches in diameter and 4 inches long, thus holding a large amount of quartz. It is heavily nickel plated, highly finished, and presents an attractive appearance.

Hollands' Offset Jaw Vise.

This vise is manufactured by Hollands Mfg. Company, Erie, Pa., and is illus-



Hollands' Offset Jaw Vise.

trated herewith. The large capacity of this vise for holding upright work is one of its special features. Its use in shops where there is a variety of drill press work is also referred to, as it does away entirely with bolts and clamps, holding the work more rigid and catching work that bolts or clamps will not catch. The vise is made in three sizes, with 2, 4½ and 6 inch width of jaw, and weighing respectively 6, 65 and 145 pounds.

CONTENTS.

CURRENT HARDWARE PRICES.

MARCH 8, 1892.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Adjusters, Blind.

Domestic.....₩ doz $3.00, 33⅓%
Excelsior.....₩ doz $10.00.....50&10&2%
North's.....list net @10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils.—

Eagle Anvils, ₩ ℔ 10¢.....15@15&5%
Peter Wright's.....11@11½¢
Armitage's Mouse Hole.....10½@11¢
Am. Wrought, Horseshoe b'and.11@11½¢
Trenton.....10@10½¢
Wilkinson's.....10½@11¢
Moore & Barnes Mfg. Co.....33⅓%

Anvil Vise and Drill—

Millers Falls Co., $18.00.....20%
Chenev Anvil and Vise.....25%
Allen Anvil and Vise, $5.00.....40&10%
Star.....45&5%

Apple Parers—See Parers, Apple, &c

Augers and Bits—

Douglass Mfg. Co.....
Wm. A. Ives & Co.....
Humphreysville Mfg. Co.....
French, Swift & Co. (F. H. Beecher, P. S. & W. Co.....
Rockford Bit Company.....
} 70&10@20&10&5%

Cook's, Douglass Mfg. Co.....55%
Cook's, N. H. Copper Co.50&10@50&10&5%
Ives' Circular Lip.....60%
Patent Solid Head.....30%
C. E. Jenning & Co., No. 10, extension lip.....40%
C. E. Jennings & Co., No. 30.....60%
C. E. Jennings & Co., Auger Bits, ₩ set, 32¼ quarters, No. 5, $5; No. 30, $3.50.20%
Lewis' Patent Single Twist.....45%
Russell Jennings' Augers and Bits.25&10%
Imitation Jennings' Bits.....60@60&10%
Pugh's Black.....20%
Pugh's Jenning's Pattern.....4's
Car Bits.....60@60&10%
Car Bits, P. S. & W. Co.....60&10%
Snell's Car Bits.....60%
L Hommodieu Car Bits.....15&10%
Forstner Pat. Auger Bits.....20%
Cincinnati Bell-Hangers' Bits.....30&10%

Bit Stock Drills—

Morse Twist Drills.....50&10&5%
Standard.....50&10&5%
Cleveland.....50&10&5%
Syracuse, for metal.....50&10%
Syracuse, for wood (wood list).30@30&5%
Cincinnati, for wood.....30&10%
Cincinnati, for metal.....45&10%

Expansive Bits—

Clarks' small, $18; large, $26..35@35&10%
Ives' No. 4, ₩ doz $60.....40%
Swan's.....40%
Steer's, No. 1, $26; No. 2, $22.....35%
Stearns' No. 2, $48.....20%

Gimlet Bits—

Common.....₩ gross $2.75@$3.25
Diamond.....₩ doz $1.10.....25&10%
Bee.....25@25&5%
Double Cut, Shepardson's.....45@45&10%
Double Cut, Ct. Valley Mfg. Co.....30&10%
Double Cut, Hartwell's, ₩ gro.....$5.25
Double Cut, Douglass'.....40&10%
Double Cut, Ives'.....60@60&10%

Hollow Augers—

Ives.....
French, Swift & Co.....
Douglass'.....
} 33⅓@ 33⅓&10%

Bonney's Adjustable, ₩ doz $48.....40&10%
Stearns'.....20&10%
Ives' Expansive, each $4.50.....50&5%
Universal Expansive, each $4.50.....20%
Wood's.....25@25&10%
Cincinnati Adjustable.....25&10%
Cincinnati Standard.....25&10%

Ship Augers and Bits—

L'Hommedieu's.....15&10@15&10&5%
Watrous'.....15&10@15&10&10%
Snell's.....15&10@15&10&5%
Snell's Ship Auger Patt'n Car Bits, 15&10@15&10@5%

Awl Hafts—See Hafts, Awl.

Awls—

Awls, Sewing, Common.....₩ gr. 85¢@90¢
Awls, Should. Peg.....₩ gr. $1.50@$1.55
Awls, Pat. Peg.....₩ gr. 35¢@38¢
Awls, Shouldered Brad..₩ gr. $1.30@1 40
Awls, Handled Brad...₩ gr. $2.50@$3.00
Awls, Handled Scratch..₩ gr. $4.0(@$4.50
Awls, Socket Scratch..₩ doz. $1.10@$1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

	Plain.	Beveled.
First quality, best brands.	$7.00 @	$7.50
First qual., other brands	6.62½ @ 6.75	
Second quality	6.00	6.50

Axle Grease—See Grease, Axle.

Axles—

No. 1...3¼@3½¢, No. 2, 5¢@6¢
Nos. 7 to 14.....60&10%
Nos. 15 to 18.....47½%
Nos. 19 to 22.....70%
} 3% cash

Concord Axles, loose collar.....4½@6¢
Concord Axles, solid collar.....5½@7¢
National Tubular Self-Oiling.....33⅓@33⅓&5%

Bag Holders.—See Holders, Bag.

Balances—

Spring Balances.....40%

Chatillon, ₩ doz.	No. 2000	20	30
	$0.80	0.95	1.75 net

Chatillon Straight Balances.....40%
Chatillon Circular Balances.....50&10%

Barb Wire.—See Wire, Barb.

Bars.

Crow—

Cast Steel.....₩ ℔ 3½¢
Iron, Steel Points.....₩ ℔ 3¢

Basins, Wash—

Standard Fiberware, No. 1, 10½ inch, $2; 12-inch, $2.25; 13½-inch, $2,75; 15-inch, $3.25.

Beams, Scale—

Scale Beams, List Jan. 12, '82...50&10@ 50&10&5%
Chatillon's No. 1.....40%
Chatillon's No. 2.....50%
Custer's.....33⅓%

Beaters—

Egg—

Dover.....₩ doz $1.50
Duplex (Standard Co.).....₩ doz $1.25
Rival (Standard Co.)..₩ doz $1.00
Duplex Extra Heavy (Standard Co.)...₩ doz $3.50
Bryant's.....₩ gro $14.00
Double (H. & R. Mfg. Co.), ₩ gro. No. 0, $12.00; No. 1, $15.00; No. 2.....$36.00
Kasy (H. & R. Mfg. Co.).....₩ gro $12.00
Triple (H. & R. Mfg. Co.).....₩ gro $16.50
Spiral.....₩ gro $4.25 @ 4.50
Improved Acme (H. & R. Mfg. Co.).....₩ gro $9.00
Paine, Diehl & Co.'s.....₩ gro $24.00
Silver & Co.....₩ doz $5.50

Culinary—

Keystone, P.D.&C., Each, No. 1, $1; No. 2, $2.....20%

Bells—

Cow—

Common Wrought.....60&10%
Western, Sargent's list.....70&10%
Kentucky, "Star".....20&10%
Kentucky, Sargent's list.....70&10%
Kentucky Durham.....70&10%
Dodge, Genuine Kentucky.....70@70&10%
Texas Star.....50&10@50&10&5%

Door—

Gong, Abbe's.....33⅓&10%
Gong, Yankee.....45&10%
Gong, Barton's.....40&10@50%
Crank, Taylor's.....25&10%
Crank Brooks'.....50&10&2%
Crank Cone's.....10%
Crank, Connel's.....20&10%
Lever, Sargent's.....60&10%
Lever, Taylor's Bronsed or Plated....net
Lever, Taylor's Japanned.....25&10%
Lever, R. E. M. Co.'s.....50&10&2%
Pull, Brook's.....50&10&2%

Electric,

Gong, Annunciator.....20%
Bigelow & Dowse.....20%
Taylor's.....20%

Hand—

Light Brass.....70&10%
Extra Heavy.....70%
White.....70%
Silver Chime.....33⅓&10%
Globe Cone's Patent).....25&10@35%

Miscellaneous—

Call.....40@40&5%
Farm Bells.....₩ ℔ 3¢@3½¢
Steel Alloy Church and School Bells..40%

Bellows—

Blacksmiths'.....60&10@60&10&5%
Molders'.....40&10@5%
Hand Bellows.....40&10@50%

Belting, Rubber—

Common Standard.....70@70&10&5%
Standard.....70@70&5%
Extra.....60@60&10%
N.Y.B.&P.Co., Carbon.....60%
N.Y.B.&P.Co., Diamond.....50%
N.Y.B.&P.Co., Para.....40%

Bench Stops—See Stops, Bench.

Benders and Upsetters, Tire.

Stoddard's Lightning Tire Upsetters..15%
Detroit Perfected Tire Bender.....15%

Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Ordinary Tackle, list May 20, 1889... See Trade Report
Cleveland Block Co., Mal. Iron.....50%
Moore's Novelty, Mal. Iron.....50%
Sure Grip Steel Tackle Blocks.....25%

Boards, Stove.

Wood Lined Crystal.....50%
Oxidized.....45%
Embossed.....50%
Paper Lined Zinc.....55%
Crystal.....55%
Embossed.....55%
New Tacoma.....55%

Bolts—

Carriage, Machine, &c.—

Com. list June 10, '84.....75&10&2%
Genuine Eagle, Norway, list Oct., '84...80@80&10%
Phila. pattern, list Oct. 7, '84..75@75&10%
R.B.&W., old list.....70%
Machine, list Jan. 1, 1890.....80@80&5%
Bolt Ends, list Jan. 1, 1890.....75&10@75&10&5%

Door and Shutter—

Cast Iron Barrel, Square, &c..70@70&10%
Cast Iron Shutter Bolts.....70@70&10%
Cast Iron Chain (Sargent's list)...65&10%
Ives' Patent Door Bolts 60&10@60&10&5%
Wrought Barrel.....70@70&10%
Wrought Square.....70@70&10%
Wr't Shutter, all Iron, Stanley's..60&10%
Wr't Shutter, Brass Knob, " ..40&10%
Wr't Shutter, Sargent's list.....60&10%
Wr't Sunk Flush, Sargent's list...55&10%
Wr't Sunk Flush, Stanley's list...50&10%
Wr't B.K.Flush. Com'n " ...55&10%

Stove and Plow—

Stove.....60%
Plow.....60&5%
R. B. & W., Plow.....55%

Tire—

Common, list Feb. 28, '83.....65%
Port Chester Bolt and Nut Company:
Empire, list Feb 28, '83.....65%
Keystone, Philadel., list Oct. '84....80%
Norway, Phila., list Oct. '84.....75%
American Screw Company:
Norway, Phil., list Oct. 16, '84.....75%
Eagle, Phil., list Oct. 16, '84.....80%
Philadel., list Oct. 16, '84.....80%
Bay State, list Feb. 28, '83.....65%
R.B.&W., Philadel., list Oct. 16, '84.....80%

Borers, Tap.

Common and Ring.....20&10%
Ive's Tap Borers.....33⅓&5%
Enterprise Mfg. Co.....20&10&30%
Clark's.....33⅓@35%

Borax.....₩ ℔ 9½@10½¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon.

Per ℔.....2¾¢

Braces.—

American Bit Brace Co.:
Nos. 10, 12, 20.....60&10%
Nos. 11, 21, 24, 27.....70&10%
Nos. 22, 23, 25.....60&10&5%
Nos. 13, 26, 36, 37.....70&10&5%
Ball Braces, net.....$1.12 to $1.25@
Amidon's
Barker's Imp'd Plain.....75&10@80%
Barker's Imp. Nickeled.....65&10@70%
Ratchet.....75&10@80%
Eclipse Rachet.....60%
Globe Jawed.....40@40&10%
Corner Brace.....40@40&10%
Universal, 8 in., $2.10; 10 in.....$2.25
Buffalo Ball.....$1.10@$1.1
Barber's,
Nos. 10 to 16.....50@50&10%
Nos. 30 to 33.....50@50&10%
Nos. 40 to 63.....50&10@50&10&5%
Saxton's,
Barker's Imp. Polished.....75&10@80%
Barker's Imp. Nickeled.....65&10@70%
Ratchet, Polished.....50&10@60%
Ratchet, Nickeled.....40&10@50%
Buffalo Ball.....net, $1.10@$1.15
Bartholomew's,
Nos. 25, 27 and 30.....50&10@60&5%
Nos. 117, 118, 119.....70@70&5%
Common Ball, American.....$1.00@$1.10
Fray's Genuine Spofford's..50&5@50&10%
Fray's No. 70 to 120, 81 to 123, 207 to 414 50&10%
Ives' New Haven Novelty.....70@70&5%
New Haven Ratchet.....60&5@60&10%
Barber Ratchet.....60&5@60&10%
Barbers.....60&5%
Spofford.....60&5@60&10%
Osgood's Ratchet.....40&10@50%
P. S. & W. Co., Peck's Patent.....60%

Brackets—

Shelf, plain.
Regular list.....65@70%
Sargent's list.....66⅔@66⅔x10%
Shelf, fancy.
Sargent's list.....66⅔@66⅔x10%
Other makes at a wide range of prices.

Bright Wire Goods—See Wire.

Broilers—

Henis' Self-	Inch	9	10	9x11
Basting.	Per doz.	$4.50	5.50	6.50

New Haven.....
Wire Goods Co.....65&10%
Morgan Odoriess.....₩ doz $12, 33⅓%

Buckets, Well.

Galvanized—

Hill's.....₩ doz, 12 qt, $4.25; 14 qt, $5.2
Iron Clad.....₩ doz. 14 qt, $4.25@$4.5
Helwig's Flat Iron Band.....$3.75
Helwig's Wired Top.....₩ doz $4.00

Bull Rings—See Rings, Bull.

Butchers' Cleavers—See Cleavers Butchers'.

Butts—

Brass—

Wrought Brass.....80@80&10%
Cast Brass, Tiebout's.....50%
Cast Brass, Fast.....33⅓&10%
Cast Brass, Loose Joint.....33⅓&10%

Cast Iron—

Fast Joint, Narrow.....50&10&5@60%
Fast Joint, Broad.....50&10@60%
Loose Joint.....
Loose Joint, Japanned.....
Loose Joint, Jap. with Acorns..
Parliament Butts.....
Mayer's Hinges.....
Loose Pin, Acorns.....
Loose Pin, Acorns, Japanned...
Loose Pin, Acorns, Japanned, Plated Tips.....
} ..70&10@75%

Wrought Steel—

Fast Joint, Narrow.....
Fast Joint, Lt. Narrow.....
Fast Joint, Broad.....
Loose Joint, Broad.....
Table Butts, Back Flaps, &c ....
Inside Blind, Regular.....
Inside Blind, Light.....
Loose Pin.....
} .70&10@75%

Bronsed Wrought Butts.....50%

Calipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt.....5½@6¢
Burke's, One Prong, Blunt.....5½@6¢
Burke's, Two Prong, Blunt.....7½@8¢
Burke's, One Prong, Sharp.....6½@7¢

Can Openers—See Openers Can.

Caps—

Percussion, ₩ 1000—

Hicks & Goldmark's and Union Metallic Cartridge Co.
F. L. Waterproof, 1-10's.....35@37¢
E. B. Trimmed Edge, 1-10's.....47@50¢
E. B. Grnd. Edge, Cent. Fire, 1-10's.....47@50¢
Musket Waterproof, 1-10's.....50@53¢
G. D.....37@30¢
A. B. Genuine Imported.....45¢
Eley's E. B.....56¢ @ 58¢
Eley's D Waterproof, Central Fire...$1.60

Primers—

Berdan Primers, $1.00.....2%
B. L. Caps (for Sturtevant Shells) $1.00.....2%
All other Primers, $1.20.....3%

Cards—List January 23, 1891.

Watson's Cotton, Wool, Horse and File.....25%

Carpet Stretchers—See Stretchers Carpet.

Carpet Sweepers—See Sweepers Carpet.

Cartridges—

Rim Fire Cartridges.....50&5&2%
Rim Fire Military.....15&2%
Cent. Fire, Pistol and Rifle.....25&5&2%
Cent. Fire, Military and Sporting 15&5&2%
Blank Cartridges, except 22 and 32 cal., additional 10% on above discounts.
Blank Cartridges, 22 cal., $1.75.....2%
Blank Cartridges, 32 cal., $3.50.....2%
Primed Shells and Bullets.....15&5&2%
B. B. Caps, Round Ball, $1.75.....3%
B. B. Caps, Con. Ball, Swgd., $2.00.....3%

Casters—

Bed.....
Plate.....
Shallow Socket.....
} Brass....55@55&10%
} Others...60@60&10%

Deep Socket.....40&10%
Yale Casters, list May, 1884...30&10@40%
Yale, Gem.....60@60&5%
Martin's Patent (Phœnix).....45&10@50%
Payson's Anti-friction.....70%
Payson's Truck.....70%
Giant Truck Casters.....30%
Stationary Truck Casters.....50&10%
Socket Truck Casters.....50%

Cattle Leaders—See Leaders, Cattle.

Cement.

Victor Elastic.....5 ℔ pails ₩ ℔ 5¢

Chain—

Trace, Wagon and Fancy Chains, List revised April 21, 1890.....60@ 60&10%

American Coil, in cask lots,

3-16	¼	5-16	⅜	7-16	½	⅝	¾
$7.60	5.45	4.45	3.80	3.65	3.50	3.40	3.25

Less than cask lots, add ½¢@½¢ ₩ ℔.
German Coil, list Oct. 6, 1890..60@60&5%
German Halter Chain, list Oct. 6, 1890 60@60&5%
Covert Halter.....60&5%
Covert Traces.....35@3%
Covert Heel Chain.....50&5%
Oneida Halter Chain.....60@60&5%
Galvanized Pump Chain.....₩ 5½¢@6¢
Jack Chain, Iron.....75&10@80%
Jack Chain, Brass.....75@75&10%

Chalk—

White, case lots, ₩ gr 50¢; small lots 55@56¢
Red, case lots...₩ gr 67¢; small lots 77@78¢
Blue, case lots...₩ gr 75¢; small lots 85¢
See also Crayons.

Chalk Lines—See Lines.

Chisels—

Socket Framing and Firmer.

P. S. & W.....
New Haven.....
Witherby.....
Mix.....
Ohio Tool Co.....
} ..75@75&10%

Douglass.....75@75&5%
Buck Bros.....30%
Merrill.....60&10@60&10&5%
L. & I. J. White.....30@30&5%

Tanged and Miscellaneous.

Tanged Firmers.....40&10@50%
Butchers'.....$4.75@$5.00
Spear & Jackson's.....$5 to $
Buck Bros.....30%
Cold Chisels, ₩ ℔.....15@16%

Chucks—

Beach Pat.....each, $8.00.....20%
Morse's Adjustable, each, $7.00, 20@20&5%
Danbury.....each, $6.00, 30@30&5%
Syracuse, Balz Pat.....25%
Graham Patent.....33⅓%
Skinner's Patent Chucks.
Combination Lathe Chucks.....33⅓%
Universal Lathe Chucks.....40%
Independent Lathe Chucks.....40%
Drill Chucks.....15%
Union Mfg. Co.,
Victor.....$8.50, 25%
Combination.....40%
Universal.....40%
Independent.....40%

Churns.

Tilton Union, each, 5 gal. $3.25; 7 gal. $3.75; 10 gal..$4.25.
McDermaid Star Barrel Churn, each 6 gal., $2.60; 10 gal., $2.75 15 00 20 gal., 3 75.

Clamps—

B. I. Tool Co.'s Wrought Iron.....25%
Adjustable, Cincinnati.....15&10%
Adjustable, Hammers.....15%
Adjustable, Stearn's.....30&30&10%
Adjustable Adjustable Cabinet and Corner.....30&30&10%
Cabinet, Sargent's.....60%&10%
Carriage Makers', Sargent's.....70&10%
Carriage Makers', P., S. & W. Co..40&10%
Eberhard Mfg. Co.....40&5&40&10%
Warner's.....40&10%&40&10&5%
Saw Clamps, see Vises, Saw Filers'.
Carpenters', Cincinnati.....25&10%

Cleavers.

Butchers'.

Bradley's.....25@30%
L. & I. J. White.....20&5%
Seaty's.....40@40&5%
New Haven Edge Tool Co.'s.....40%
P., S. & W.....33⅓&5@33⅓&10%
Stover.....30%
Foster Bros.....30%
Schulte, Lohoff & Co.....40@40&5%

Clips—

Norway, Axle, ¼ & 5-16.....55&5&5%
2nd grade Norway Axle, ¼ & 5-16. 65&5%
Superior Axle Clips.....60%&5@70%
Norway Spring Bar Clips, 5-16..60&5&5%
Wrought-Iron Felloe Clips.....₩ lb, 5½¢
Steel Felloe Clips.....₩ lb, 5¢
Baker Axle Clips.....25%

Cloth and Netting, Wire—See Wire, &c.

Cockeyes.....50%

Cocks, Brass.

Hardware list.....50&2%

Coffee Mills—See Mills, Coffee

Collars, Dog, &c.

Medford Fancy Goods Co.....40&10%
Embossed, Gilt, Pope & Steven's list 30&10%
Leather, Pope & Steven's list.....40%
Brass, Pope & Steven's list.....40%
Chapman Mfg. Company.....50&10@60%

Combs, Curry.

Fitch's.....50&10@50&10&10%
Rubber, per doz $10.00.....20%
American Curry Comb Co.....Net prices

Compasses, Dividers, &c.—

Compasses, Calipers, Dividers.70@70&10%
Bemis & Call Co.'s
Dividers.....60&5%
Compasses & Calipers.....50&5%
Wing and Inside or Outside.....50&5%
Double.....60%
(Call's Pat. Inside).....30%
Excelsior.....50%
J. Stevens & Co.'s.....25&10%
Starrett's
Spring Calipers and Dividers....25&10%
Lock Calipers and Dividers.....25%
Combination Dividers.....25%

Coopers' Tools—See Tools, Coopers'.

Cord—

Sash.

Common.....₩ lb, 10¢ @ 11¢
Patent, good quality.....₩ lb, 12 @ 12¢
White Cotton Braided, fair.₩ lb, 24¢@25¢
Common Russia Sash.....₩ lb, 12½@13¢
Patent Russia Sash.....₩ lb, 14¢
Cable Laid Italian Sash.....₩ lb. 21@22¢
India Cable Laid Sash.....₩ lb, 12¢
Silver Lace—
A Quality, White, 50¢.....25%
A Quality, Drab, 55¢.....25%
B Quality, White, 30¢.....10%
B Quality, Drab, 35¢.....10%
Sylvan Spring Extra Braided White,34¢
Sylvan Spring, Extra Braided, Drab..30¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....28¢
Massachusetts, White.....26¢
Samson—
Braided, White Cotton, 50¢..30@30&5%
Braided, Drab Cotton, 55¢...30@30&5%
Braided, Italian Hemp, 55¢..30@30&5%
Braided, Linen, 80¢.....30@30&5%
Tate's Cotton Braided, White.₩ lb, 28¢.10%

Wire Picture.

Braided or Twisted.....75&10%

Corkscrews—See Screws, Cork.

Corn Knives and Cutters—See Knives, Corn.

Crackers, Nut—

Table (H. & B. Mfg. Co.).....40%
Blake's Pattern.....₩ doz $2.00, 10%
Turner & Seymour Mfg. Co.....50%

Cradles—

Grain.....50&5&2@50&10&2%

Crayons.

White Crayons, ₩ gross.....10¢
D. M. Stewart Mfg. Co., Metal Workers, ₩ gr, $2.50.....25%
D. M. Stewart Mfg. Co., Rolling Mill, ₩ gr, $2.50.....25%
See also Chalk.

Crow Bars—See Bars, Crow.

Curry Combs—See Combs, Curry.

Curtain Pins—See Pins Curtain.

Cutters—

Meat.

Dixon's ₩ doz.....40&5%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Woodruff's ₩ doz.....40&5%

Nos.	100	150
	$15.00	$18.00

Hales Pattern ₩ doz.....70@70&5%

Nos.	11	12	13
	$27.00	$33.00	$45.00

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise.....30%

Nos.	10	12	22	32	42
Each	$3	$2.50	$4	$6	$15

Great American Meat Cutter.....30%

Nos.	112	116	118	120	122
Each	$2.00	$2.75	$3.00	$2.50	$4.00

Miles' Challenge ₩ doz.....45@45&10%

Nos.	1	2	3
	$22.00	$30.00	$40.00

Home No. ..... ₩ doz $26.00, 55&10%

Draw Cut, each:

Nos.	5	7	6	8
	$50	$75	$80	$225

.....20@25%

Beef Shavers (Enterprise).....30&10@30%
Little Giant (P. S. & W. Co.).....50%
Chadborn's Smoked Beef Cutter, ₩ doz $66.00

Tobacco.

Champion.....20&10@30%
All Iron.....₩ doz $4.25
Nashua Lock Co.'s..₩ doz, $18.00 50@55%
Wilson's.....55%
Sargents's.....₩ doz, $24, 55&10%
Acme.....₩ doz $20.00, 40%

Washer.

Smith's Pat.....₩ doz $12.00, 20&10&10%
Johnson's.....₩ doz $11.00, 33⅓%
Penny's.₩ doz Pol. $14; Jap'd, $16.00, 55%
Appleton's.....₩ doz $16.00, 60&10%
Bonney's.....30&10%
Cincinnati.....25&10%

Dampers, &c—

Dampers, Buffalo.....40&10%
Buffalo Damper Clips.....40&10%
Crown Damper.....40%
Excelsior.....40&10%

Diggers, Post Hole, &c.—

Samson Post Hole Digger, ₩ doz $36.00, 25%
Fletcher Post Hole Augers, ₩ doz $36, 20%
Eureka Diggers.....₩ doz $12.50@14.00
Leed's.....₩ doz $8.00@9.00
Vaughan's Post Hole Auger, ₩ doz $13.00@14.00
Kohler's Little Giant.....₩ doz. $18.00
Kohler's Hercules.....₩ doz. $7.50
Kohler' New Champion.....₩ doz. $9.00
Schniedler.....₩ doz. $18.00
Ryan's Post Hole Diggers..₩ doz $24.00
Cronk's Post Bars, ₩ doz $60.00, 50&5@50&10%
Gibbs Post Hole Digger.....₩ doz $15.00
Imperial.....₩ doz $7.50
Shimer's Hollow Handle, ₩ doz, $24..40%

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.

Door Springs—See Springs, Door.

Drawers.

Money, ₩ doz.....$18&$30

Drawing Knives—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths'.....each $1.75
Blacksmiths' Self-Feeding, each $7.50,20%
Breast, P. S. & W.....40&10%
Breast, Wilson's.....30&5%
Breast, Millers Falls.....each $3.00, 25%
Breast, Bartholomew's.....each $2.50, 25&10@40%
Ratchet, Merrill's.....20@20&5%
Ratchet, Ingersoll s.....25%
Ratchet, Parker's.....20@20&5
Ratchet, Whitney's.....20&10%
Retchet, Weston's.....20@25%
Ratchet, Moore's Triple Action..25@30%
Ratchet, Curtis & Curtis.....30%
Whitney's Hand Drill, Plain, $11.00; Adjustable, $13.00.....20&10%
Wilson's Drill Stocks.....10%
Automatic Boring Tools.....$1.75@$1.85

Twist Drills—

Cleveland.....50&10&5%
Diamond, W. & B.....50&10&5%
Graham's Pat. Groove Shank 50&10&5%
Morse.....50&10&5%
New Process.....50&10&5%
Standard.....50&10&5%
Syracuse (Metal list).....50&10%

Drill Bits or Bit Stock Drills—

See Augers and Bits.

Drill Chucks.—See Chucks.

Dripping Pans-See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.....30@30&10%
Disston's.....50%
Buck Bros.....30%
Stanley R. & L. Co.'s
No. 64, Varnished Handles.... 65&10%
No. 86.....70&10%
Sargent & Co.'s
No. 1 Forged Blade.....60&10&10%
Nos. 20, 30 and 50. .....65%&10&10%
P. S. & W.....70%
Knapp & Cowles:
No. 1.....60&10@70%
No. 2.....60&10@70&5%
No. 3.....60&5@60&10%
Nos. 4 and 00, Acme and Ideal..50& 5@50&10&5%
Stearns'.....25&10&5%
Gay & Parsons.....35%
Champion.....25&10%
Clark's Pat.....30@33⅓%
Crawford's Adjustable.....30%
Ellrich's Socket and Ratchet..25@25&10%
Allard's Spiral, new list.....25%
Kolb's Common Sense ₩ doz $6.00,25&10%
Syracuse Screw-Driver Bits...30&30&5%
Screw-Driver Bits.....₩ doz. 50@75¢
Screw-Driver Bits, Parr's.....₩ gro $6.25
Fray's Hol. Hdle. Sets. No. 3. $12.00, 25@25&10%
P. D. & Co.'s all Steel.....50%
Cincinnati.....25&10%
Brace Screw Drivers.....25&10%
Buck Bros.' Screw-Driver Bits.....

Egg Beaters.—See Beaters, Egg.

Egg Poachers.—See Poachers, Egg.

Electric Bell Sets.—See Bells, Electric.

Emery.—No. 4 to No. 54 to Flour, CF

	46 gr.	150 gr.	F. FF.
Kegs, ₩ lb	4½¢	5 ¢	2½¢
½ kegs, ₩ lb	4½¢	5½¢	2½¢
¼ kegs, ₩ lb	5 ¢	5½¢	3 ¢
10-lb cans, 10 in case	6 ¢	6½¢	5 ¢
10-lb cans, less than 10	10 ¢	10 ¢	

Enameled and Tinned Ware See Ware, Hollow.

Escutcheon Pins—See Pins, Escutcheon.

Escutcheons.

Door Lock....Same dis as Door Locks.
Brass Thread.....60@60&10%
Wood.....25%

Expanded Metal.

List No. 5.

Lathing.....10%
Fencing, Painted Sheets.....20%
Netting, Painted Sheets.....20%
Door Mats, Galvanized.....25%
Window Guards, Paneled.....15%
Tree Guards, Paneled.....15%

Extractors, Lemon Juice—See Squeezers, Lemon.

Fasteners, Blind—

Mackrell's, ₩ doz. $1.00.....20@20&10%
Van Sand's Screw Pat., $15 ₩ gr..60&10%
Van Sand's Old Pat., $15.00 ₩ gr..55&10%
Austin & Eddy No. 2008 ₩ gr.....$4.00
Security Gravity, ₩ gr.....$9.00
Zimmerman's.....45%

Faucets.—

Fenn's.....40%
Bohren's Pat. Rubber Ball.....25%
Fenn's Cork Stops.....33⅓%
Star.....60%
Frary's Pat. Petroleum.....40&5&2%
B. & L. B. Co.
West's Lock, Open and Shut Key...50%
Star, Metal Plug, new list.....40%
Lockport, Metal Plug, reduced list..60%
Metallic Key, Leather Lined....60&10@ 60&10&10%
Cork Lined.....70&5@70&10%
Burnside's Red Cedar.....50%
Burnside's Red Cedar, bbl lots....60&10%
John Sommers'
Peerless Best Block Tin Key.....40%
IXL, 1st quality, Cork Lined.....50%
Diamond Lock.....40%
Perfection, Fla. Red Cedar.....50%
Goodenough Cedar.....50%
Boss Metallic Key.....50%
Reliable Cork Lined.....60%
Western Pattern Cork Lined.....50%
Self-Measuring
Enterprise, ₩ doz $36.00.....30&10%
Lane's, ₩ doz $36.00.....25&10%
Victor, ₩ doz $36.00.....25&10%

Felloe Plates—See Plates, Felloe.

Fifth Wheels.—

Derby and Cincinnati.....45&5%
Brewster.....50&5%

Files—

Domestic—

Nicholson Files, Rasps, &c.....60&10@60&10&5%
Nicholson (X. F.) Files.....25%
Nicholson's Royal Files (Seconds).....75% (extra prices on certain sizes)
G. & H. Barnett (Black Diamond).....60&10@60&10&5%
Arcade.....60&10@60&10&10%
Eagle.....60&10&5@60&10&10%
Other makers, best brands60&10@60&20%
Fair brands.....60&10&10@70&5%
Second quality.....70&10@75&10%
Heller's Horse Rasps.....50&7½@50&10%
McCaffrey's Horse Rasps.....50&10%
Chesea Horse Rasps, Hand Cut...50&10%
Arcade Horse Rasps.....60&10%

Imported—

Butcher.....Butcher's list, 20%
Stubs.....Stubs list, 25@30%

Fixtures.

Grindstone—

Sargent's Patent.....70&10%
Reading Hardware Co.....30&10%
P., S. & W. Co.....50&10%

Fluting Machines—See Machines, Fluting.

Fluting Scissors—See Scissors, Fluting.

Fodder Squeezers—See Squeezers, Fodder.

Forks—

Hay, Manure, &c., Asso List, 65&5@65&10%
Hay, Manure, &c., Phila. List. 60@60&5%
Plated, see Spoons.

Frames—

Saw—

White Vermont.....₩ gro $9.00@10.00
Red, Polished and Varnished.....₩ doz $1.50, 25%

Screen, Window and Door—

Porter's Pat. Window and Door Frame. 33⅓&10%
Warner's Screen Corner Irons...33⅓@ 33⅓&10%
Stearns' Frames and Corners..25&25&10%
Cortland.....40@40&5%

Freezers, Ice Cream—

White Mountain.....60@60&5%
Granite State.....55@65&5%
Arctic.....70@70&5%
American.....60%
Buffalo Champion.....65@65&5%
Shepard's Lightning.....65@65&5%
Gem.....65%
Blizzard.....70%
Double Action Crown.....60%
Crown.....60%
Star.....60%
Peerless.....60&10%
Giant.....60%
Zero.....60&10&10%
Boss and Pet.....60&10&10&10%
Keystone, P. D. & Co., each $1.50.....20%

Fruit and Jelly Presses—See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Funnels.

Gersdorff's Perfection, Standard and Globe; *Tin*, 1 gro., 10 %; 2 to 5 gro., 20 %; 5 to 10 gro.....30 %
Copper, 1 to 6 doz., 15 %; 6 to 12 doz., 20 %; over 12 doz.....25 %

Furnaces, Soldering.

Burgess No. 3 Gem, tin reservoir....$7.00
Burgess No. Gem, copper reservoir, 8.50

Fuse—Dis. 12½%. ₩ 1000 ft

Common Hemp Fuse, for dry ground..$3.70
Common Cotton Fuse, for dry ground 3.35
Single Taped Fuse, for wet ground.. 3.35
Double Taped Fuse, for very wet gr. 4.35
Triple Taped Fuse, for very wet gr.. 5.60
Small Gutta Percha Fuse, for water. 7.50
Large Gutta Percha Fuse, for water.12.00

Gates, Molasses—

Stebbin's Pattern.....30@30&5%
Stebbin's Genuine.....60&10&10%
Stebbin's Tinned Ends.....40&10%
Chase's Hard Metal.....50&10%
Bush's.....50%
Lincoln's Pattern.....70@70&10%
Weed's.....30&10%
Boss, ₩ doz:
No. 1, $7; No. 2, $8; No. 3, $9; No. 4, $10.....60&10&10%

Gauges.

Marking, Mortise, &c.....60&10%
Starrett's Surface, Center and Scratch. 25&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....20&10%
Wire, Wheeler, Madden & Co.....10%
Wire, Morse's.....25%
Wire, Brown & Sharpe's.....10@20%
Wire, P. S. & W. Co.....10&10

Gimlets—

Nail and Spike.....50&10&5%
"Eureka" Gimlets.....40&10%
"Diamond" Gimlets.....₩ gr $5.00
Double Cut, Shepardson's.....45@45&5%
Double Cut, Ives'.....60@60&5%
Double Cut, Douglass'.....40&10%
"Bee," ₩ gr $12.....35@35&5%

Glue—

Le Page's Liquid.....25@25&5%
Upton's Liquid.....35%
Improved Process.....25@25&5%
Dodd's Liquid Glue.....25@25&5%

Glue Pots—See Pots, Glue.

Grease, Axle.

Fraser's.....Keg ₩ lb 4¢, Pail ₩ lb 5¢
Fraser's, in boxes.....₩ gr $9.50
Dixon's Everlasting, in bxs...₩ doz 1lb $1.20; 2 lb $2.00
Dixon's Everlasting....10-lb pails, ea. 85¢
Lower grades, special brands, ₩ gr $5.50@$7.00

Grindstones—

Small, at factory.....₩ ton $7.50@8.00
Family, regular list.....60%
Family, Cleveland Stone Co.....50%

Grindstone Fixtures—See Fixtures Grindstone.

Hack Saws—See Saws.

Hafts, Awl.

Sewing, Brass Fer. ₩ gr, $3.50.....45&10%
Pat. Sewing, Short.$1.00 ₩ doz.....40&10%
Pat. Sewing, Long.....₩ doz $1.50
Pat. Peg, Plain Top. ₩ gr $10.00.....45&10%
Pat. Peg, Leather Top.₩ gr $12.00.45&10%

Halters.

Covert's, Rope, Jute.....60&10&10&2%
Covert's, Rope, 7-16-in., Jute.....70&2%
Covert's, Rope, ½-in. Hemp.....50&2%
Covert's Adj. Rope Halters.....40&2%
Covert's Hemp Horse and Cattle Tie, 50&2%
Covert's Jute Horse Ties.....70&2%
Covert's Jute Cattle Ties.....70&10&2%
Covert's Adj. Web Halters.....35&5&2%

Hammers—

Handled Hammers—

Maydole's, list Dec. 1, '85.....25&10@35%
Buffalo Hammer Co.
Humason & Beckley
Atha Tool Co.
Verree.....50@50&10%
C. Hammond & Son.....40&10@—%
Fayette R. Plumb.
Artisans' Choice, A. E. Nail.....40&10%
Regular Y. & P., A. E. Nail.....50%
Horseshoe Turning Hammers.....50%
Other Hammers.....50&10%
Cheney's Claw.....40&10%
Cheney's Machinist's & Riveting.50&5%
Hartford, Nail Hammers.....40&5%
Hartford, Machinists', &c...50&5@50&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 & 1.75.....30&10%
Nelson Tool Works.....40&10%
Warner & Nobles.....20@25%
Peck, Stow & Wilcox.....40%
Sargent's.....33⅓&10%

Heavy Hammers and Sledges—

3 ₩ and under.....₩ lb 40¢
3 to 5 ₩.....₩ lb 36¢ } 70@70&10%
Over 5 ₩.....₩ lb 30¢
Wilkinson's Smiths'.....10¢@11¢₩ lb

Handcuffs and Leg Irons—See Police Goods,

Handles—

Cross-Cut Saw Handles—

Atkins' No. 1 Loop, ₩ pair, 28¢; No. 3 13¢; No. 6, 16¢; No. 2 and No. 4 Reversible, 18¢.
Champion.....18¢

Iron, Wrought or Cast—

Door or Thumb.

Nos.	0	1	2	3	4
Per doz.	$0.90	1.00	1.10	1.35	1.50

80&10&

Boggin's Latches.....₩ doz 30¢@$3
Bronze Iron Drop Latches..₩ doz 70¢ net
Jap'd Store Door Handles—Nuts, $1.32 Plate, $1.10; no Plate, $0.88.....net
Barn Door, ₩ doz $1.40.....10&10%
Chest and Lifting.....70%

Wood—

Saw and Plane.....40&10@40&10&5
Hammer, Hatchet, Axe, &c.... 40@40&5%
Brad Awl.....₩ gr $2.00
Hickory Firmer Chisel, ass'd..₩ gr 4.50
Hickory Firmer Chisel, large.₩ gr 5.00
Apple Firmer Chisel, ass'd...₩ gr 5.00
Apple Firmer Chisel, large...₩ gr 6.00
Socket Firmer Chisel, ass'd...₩ gr 3.00
Socket Framing Chisel, ass'd.₩ gr 5.00
J. B. Smith & Co.'s Pat File..... 50
File, assorted.....₩ gr 2 75 } 50%
Auger, assorted.....₩ gr 5.00 }
Auger, large.....₩ gr 7.00
Pat. Auger, Ives'.....30&10%
Pat. Auger, Douglass.....₩ set $1.25
Pat. Auger, Swan's.....₩ set $1.00
Hoe, Rake, Shovel, &c.....50&10%

Hangers—

Barn Door, old patterns...60&10&10@70%
Barn Door, New England...60&10&10@70
Samson Steel Anti-Friction.....55%
Orleans Steel.....55%
Hamilton Wrought Wood Track.....55%
U. S. Wood Track.....65%
Champion.....60&10%
Rider and Wooster, Medina Mfg. Co.'s list.....70%
Climax Anti-Friction.....55%
Climax Anti-Friction for Wood Track55%
Zenith for Wood Track.....55%
Steed's Steel Arm.....50%
Challenge, Barn Door.....50%
Sterling.....50@50&10%
Victor, No. 1, $15.00; No. 2, $16.50: No. 3, $18.00.....50&2%
Cheritree.....50&10%
Kidder's.....50&10@60%
Boss.....60&10%
Best Anti-Friction.....60&10%
Duplex (Wood Track).....60&10&5%
Terry's Pat., ₩ doz pr. 4 in, $10.00; 5 in. $12.00.....50&10%
Terry's Steel Anti-Friction Leader 50&10%
Terry's Steel Anti-Friction Ideal..50&10%
Cronk's Patent, Steel Covered.....50@5%
Wood Track Iron Clad, ₩ ft. 10¢.....50 &15@60%
Carrier Steel Anti-Friction.....50&10%
Architect, ₩ set $6.00.....20%
Eclipse.....20&10%
Felix, ₩ set $4.50.....20%
Richards'.....30@30&10%
Lane's Standard.....50&5@50&10%
Lane's New Standard.....50@50&5%
Lane's Parlor.....40%
Ball Bearing Door Hanger..20&10@25&10%
Warner's Pat.....20&10@20&10&10%
Stearns' Anti-Friction.20&10@20&10&10%
Stearns' Challenge.....25&10@25&10&10%
Faultless.....40@40&5%
American, ₩ set $6.00.....20&10%
Rider & Wooster, No. 1, 62½¢; No. 2, 75¢.....40%
Paragon, Nos. 1, 2 and 3.....40&10%
Cincinnati.....25&10%
Paragon, Nos. 5, 5¼, 7 and 8.....20&10%
Crescent.....60@60&10%
Nickel Cast Iron.....50%
Nickel, Malleable Iron and Steel.....40%
Scranton Anti-Friction Single Strap33⅓%
Wild West, 4 in. Wheel, $15.00; 5 in. Wheel, $21.00.....45%
Star.....40&10@40&10&5%
May.....50&5@50&10%
Barry, $6.00.....40&10%
Interstate.....50%
Magic.....45%
Pendulum, Payson's.....40%

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.
Blood's
Hunt's
Hurd's
Mann's
Peck's
Underhill's
Buffalo Hammer Co.
Fayette R. Plumb.
C. Hammond & Son.
Kelly's
Sargent & Co.
P., S. & W. Co.
Ten Eyck Edge Tool Co.
} 40 & 10 @ 50&5 %
Collins.....10%
Schulte, Lohoff & Co.....50@50&5%

Hay and Straw Knives—See Knives.

Hinges—

Blind Hinges—

Parker.....75&2%
Huffer.....50%
Clark's, Nos. 1, 3, 5, 40 and 50 75&10&5@80%
Clark's Mortise Gravity.....50%
Sargent's Nos. 1, 3, 5, 11, 13 75&10@55&10&5%
Sargent's, No. 12.....77&10&10%
Reading's Gravity.....75&10@75&10&5%
Shepard's
Noiseless.....75&10%
Niagara.....80%
Buffalo.....80%
Clark's Genuine Pattern.....80%
O. S., Lull & Porter.....75&10%
Acme, Lull & Porter.....75%
Queen City Reversible....70&10&5@75%
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3.....75&10&2½%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%

Gate Hinges—

Western.....₩ doz $4.40, 60%
N. E.....₩ doz $7.00, 55%
N. E. Reversible.....₩ doz $5.20, 55&10%
Clark's, Nos. 1, 2, 3.....60&10&5%
N. Y. State.....₩ doz $5.00, 55&10%
Automatic.....₩ doz $12.50, 50%
Shepard's.....60&10&5%

Spring Hinges—

Geer's Spring and Blank Butts.....40%
Union Spring Hinge Co.'s list, March 1886.....2 %
Barker's Double Acting.....25%
Union Mfg. Co.....25%
Bommer's.....30%
Buckman's.....15@20%
Chicago.....30%
Bardsley's Patent.....40%
Acme.....30%
U. S.
Empire and Crown.....20%
Hero and Monarch.....55%
American, Gem, and Star.....20%
Oxford.....20%
Wiles'.....10%
Devore's.....40%
Hex.....40%
Royal.....60%
Reliable.....60%
Champion.....60%
Stearn's.....50&10%
Samson, ₩ gross.....$14.00
} Extra 5@10% often given.

Wrought Iron Hinges.

List February 14, 1891.
Strap and T.....50&10%
Corrugated Strap & T.....50@50&10%
Screw Hook and Strap.....{ 6 to 12 in., ₩ D. 4¢ / 14 to 20 in., ₩ D. 3½¢ / 22 to 36 in., ₩ D. 3¢
Screw Hook and Eye.....{ ⅛ in., ₩ D 7½¢ / ¼ in., ₩ D 5½¢ / ⅜ in., ₩ D 4½¢
Rolled Blind Hinges, Nos. 32 and 34 50&10%
Rolled Blind Hinges, Nos. 232 and 234 55&10%
Rolled Plate.....70&10%
Rolled Raised.....70&10%
Plate Hinges "Providence" { 8, 10 & 12 in., ₩ D.....5¢ / over 12 in., ₩ D.....4¢

Hoes—

Eye—

D. & H. Scovil.....20%
Lane's Crescent Planters Pattern...45&5%
Lane's Razor Blade, Scovil Pattern...30%
Maynard, S. & O. Pat.....45&5%
Sandusky Tool Co., S. & O. Pat. } 70@70& 5%
Am. Axe and Tool Co., S. & O. Pat. }
Chattanooga Tool Co., S. & O. Pat..60& 5@60&10%
Grub.....60&10%

Handled—

Garden, Mortar, &c.....70%
Planter's, Cotton &c.....70%
Warren Hoe.....60%
Magic.....₩ doz $4.00

Hog Rings and Ringers—See Rings and Ringers.

Hoisting Apparatus—See Machines, Hoisting.

Hollow-Ware—See Ware, Hollow.

Holders.

Bag.

Sprengle's Pat.....₩ doz $18.....60%

Bit.

Extension,
Barber's, ₩ doz $15.00.....40@40&10%
Ives, ₩ doz $20.00.....60&5@60&10%
Diagonal.....₩ doz $24.00, 40%
Angular.....₩ doz $24.00, 40&5%

File and Tool—

Bals Pat.....₩ doz $4.00; 25%
Nicholson File Holders.....20%
Dick's Tool Holder.....20%

Hooks—

Cast Iron—

Bird Cage, Sargent's list.....
Bird Cage, Reading.....
Clothes Line, Sargent's list..
Clothes Line, Reading list. 60&10&10@60&10&10%

Ceiling Sargent's list.....55&10&10%
Harness, Reading list..55&10@55&10&10%
Coat and Hat, Sargent's list. 55&10@60&10%
Coat and Hat, Reading.60&10@50&10&10%

Wrought Iron—

Cotton.....₩ doz $1.25
Cotton Pat. (N.Y. Mallet & Handle W'ks). 30%
Tassel and Picture (T. & S. Mfg. Co.)...50%
Wrought Staples, Hooks, &c. See Wrought Goods.

Wire—

Wire Coat and Hat, Gem, list April, 1886.....60@60&10%
Wire Coat and Hat, Miles, list April, 1886.....50@50&10%
Indestructible Coat and Hat..45@45&5%
Wire Coat and Hat, Standard.60@40&10%
Handy Hat and Coat.....50&10@60%
Steady Ceiling Hooks.....50&10@60%
Belt.....80&80&10%
Atlas, Coat and Hat.....60@60&10%
Bright Wire Goods, see *Wire.*

Miscellaneous.

Grass, No. 2, $2.00; No. 3, $2.25; No. 4, $2.50
Nolin's Grass.....₩ doz $2.25
Bush.....55@60%
Whitmetree—Patent.....55%
Hooks and Eyes—Malleable Iron. 70@70&10%
Hooks and Eyes—Brass.....60&10&10%
Fish Hooks, American.....50%
Bench Hooks.....See Bench Stops.

Horse Nails—See Nails, Horse.

Horse Shoes—See Shoes, Horse.

Hose, Rubber—

Competition.....75@75&5%
Standard.....60&10&5@60&10&10%
Extra.....50&10@60%
N. Y. B. & P. Co., Para.....25&5%
N. Y. B. & P. Co., Extra.....40@40&5%
N. Y. B. & P. Co., Dundee...50&10@60%

Huskers—

Blair's Adjustable.....₩ gr $8.00
Blair's Adjustable Clipper.....₩ gr 7.00
Hubbard's Solid Steel.....₩ gr 4.50

Indurated Fiber-Ware—See Ware, Indurated Fiber.—

Irons.

Sad—

From 4 to 10, at factory....₩ 100 ℔, $2.30@$2.40
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'....₩ doz $18.00 net
Mrs. Pott's Irons.....60@60&10%
Enterprise Star Irons.....60@60&10%
XX Cold Handle Sad Iron.....50&5@60%
Ideal Irons new list.50&10@50 & 10&10%
Salamander, Irons.....25%
B. B. Sad Irons, ₩ ℔.....3 @3½¢
Combined Fluter and Sad Iron, ₩ doz, $15.00.....15%
Fox Reversible, Self-Fluter ₩ doz $24.00
Chinese Laundry (N.E. Butt Co.) 8½¢, 15%
New England.....8¢, 15%
Mahony's Troy Pol. Irons.....25%
Sensible, list Jan. 91.....50&10&5%
Sensible Tailor's Irons.....33⅓ %
National Self-Heating.....30 %

Soldering—

Soldering Coppers.....₩ ℔ 19 @ 21¢
Covert's Adjustable, list Jan. 1 1886. 35&2%

Irons, Pinking, per doz., 65¢.

Jack Screws—See Screws.

Jacks, Wagon.

Daisy.....40%
Victor.....40%
Lockport.....40%

Kettles—

Brass, Spun, Plain, list Jan. 1, '91..25&5%
Brass, Spun, Pld. W.M. list Jan. 1, '91.20%
Enameled and Tea—See Hollow Ware.

Keys—

Lock Asso'n list Dec. 30, 1886...50&10@ 60&5%
Eagle, Cabinet, &c.....33⅓&2%
Hotchkiss' Brass Blanks.....40%
Hotchkiss, Copper and Tinned.....40%
Hotchkiss' Pad. and Cab.....35%
Ratchet Bed Keys.....₩ doz $4.00, 15%
Wollensak Tinned.....50&10%

Knife Sharpeners—See Sharpeners, Knife.

Knives.

Butcher, Shoe, &c—

Wilson's Butcher Knives, List Dec. 8, 1890.....25%
Ames' Butcher Knives.....25%
Foster Bros.' Butcher, &c.....40%
Jordan's AAAI, Butchers', list.....not
Nichols' Butcher Knives.....40&10%
W. W. Wilson, Butcher, 6 in., $2.00; 7 in., $2.70; 8 in., $3.50, &c.
Ames' Shoe and Bread.....20@25%
Ames' Bread Knives, ₩ doz $1.50, 15@20%
Moran's Shoe and Bread.....20%
Hay and Straw.....See Hay Knives.
Table and Pocket.....See Cutlery.
Corn, Auburn Mfg. Co. Western Pat., $2.00
Corn—Auburn Mfg. Co. Crescent.....$3.50
Corn—
Bradley's.....10%
Wadsworth's.....25%

Drawing—

Witherby
P. S. & W.
Mix
New Haven
Merrill
Douglas
} .75 @ 75&10 %

Watrous.....15&10@25%
L. & I. J. White.....20&5%
Bradley's.....35%
Adjustable Handle.....25@33⅓%
Wilkinson's Folding.....25@25&5%

Hay and Straw—

Lightning, from jobbers....$8.00 @ $9.00
Wadsworth's.....40&7½@40&10%
Carter's Needle.....₩ doz $11.00@$11.50
Heath's.....₩ doz $13.00@13.50
Auburn Hay, Corn, and Spear Point..50%
Auburn, Straw.....40%
Nolin's Hay.....₩ doz. $7.00 @ $8.00

Mincing.

Am. (3d quality), ₩ gr., 1 blade, $7; 2 blades, $12; 3 blades, $18.....net
Lothrop's.....20&10%
Smith's, ₩ doz, Single, $2.00: Double, $3
Knapp & Cowles.....40@45%
Buffalo Adjustable.....50&10@60%
Buffalo Double Adj'table, ₩ doz $3.00 25%

Knobs—

Door Mineral.....60@65%
Door Por. Jap'd.....70@75%
Door Por. Nickel.....$2.00@2.25
Door Por. Plated, Nickel.....$2.00@2.25
Drawer, Porcelain.....60&10@60&10&10%
Hemacite Door Knobs.....40&10@50%
Yale & Towne Wood, list Dec., 1885...40%
Furniture, Plain.....75¢ gro inch, 10%
Furniture, Wood Screws.....25&10%
Base, Rubber Tip.....70&10&5%
Picture, Judd's.....60&10&10@70%
Picture, Sargent's.....70&10%
Picture, Hemacite.....35&5%
Shutter, Porcelain.....65&10%
Carriage, Jap.....₩ gro 80¢, 60&10%
Bardsley's Wood Door, Shutter, &c..40%

Ladies.—

Melting, Sargent's.....55&10%
Melting, Reading.....35&10%
Melting, Monroe's Pat...₩ doz $4.00, 40%
Melting, P. S. & W.....35&10@40%
Melting, Warner's.....30%

Lanterns—

Tubular—

Plain with Guards, ₩ doz.....$3.75@4.00
Lift Wire, with Guards.....$4.00@4.25
Square Plain, with Guards....$3.75@4.00
Sq. Lift Wire, with Guards.....$4.50

Police Lanterns (including packages).

2¾-inch Bull's-eye Police regular. ₩ doz $3.60
3-inch Bull's-eye Police regular. ₩ doz $3.90
2¾-inch Bull's-eye Police flash light. ₩ doz $4.00
3-inch Bull's-eye Police flash light. ₩ doz $4.50

Lawn Mowers—See Mowers, Lawn.

Leaders, Cattle.

Humason, Beckley & Co.'s.....70%
Sargent's.....66⅔&10%
Hotchkiss.....30%
Peck, Stow & W. Co.....60&10%

Lemon Squeezers—See Squeezers, Lemon.

Lifters, Transom.

Wollensak's:
Class 3 and 4, Bronzed Iron.....50%
Class 3 and 4, Bronze Metal.....25%
Class 3 and 4, Brass.....35%
Skylight Lifters.....35%
Crown, Eagle and Shield.....50%
Reiher's, list Feb. 20, 1891.
Bronzed Iron Rods.....50&10&10&2%
Brass, Real Bronze or Nickel Plate..30%
Excelsior.....50&10&5 %
Shaw's.....50&10%
Payson's:
Universal.....60%
Solid Grip.....60&10%
Imperial.....50&10 %

Lines—

Cotton and Linen Fish, Draper's.....50%
Draper's and Tate's Chalk.....60%
Draper's Masons' Linen, 84 ft., No. 1, $1.25; No. 2, $1.75; No. 3, $2.25; No. 4, $2.75; No. 5, $3.25.....25%
Cotton Chalk.....50%
Samson Cotton, No. 4, $2; No. 4½, $2.50; 10%
Silver Lake, Braided, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₩ gro.....25%
Mason's Linen, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50.
Mason's Colored Cotton.....44%
Wire Clothes. Nos. 18 19 20
100 ft.....$3.50 $3.00 $2.50
Ventilator Cord, Samson Braided, White or Drab Cotton..₩ doz $7.50, 10%

Links, Open.

Terry's—per gro.:
Nos..... 1 2 3 4
$6.00 8.00 12.00 16.00

Locks, &c.—

Cabinet—

Eagle, Gaylord Parker and Corbin... } List March, '84, rev Jan. 1, '85..33½&2%
Delta, Nos. 36 to 39.....40%
Delta, Nos. 51 to 63.....40&10%
Delta, Nos. 86 to 96.....30%
Stoddard Lock Co.....30&33⅓%
"Champion" Night Latches.....40%
Barnes Mfg. Co.....40@40&10%
Eagle and Corbin Trunk "Champion" Cab. and Combin...33⅓&2%
Yale.....net prices
Romer's.....35%

Door Locks, Latches, &c.

R. & E. Mfg. Co., list Mar. 20, 1889.....
Mallory, Wheeler & Co., list July, '88.....
Sargent & Co., list Aug. 1, '88.....
Reading Hardware Co., list Feb. 2, '88.....
} 65&10@70% Much lower net prices often made.

Brittan, Graham & Mathes, list Jan. 1890.....60&10&10%
Parkins' Burglar Proof.....60&33⅓%
Plate.....33⅓&2%
Barnes Mfg. Co.....40@40&10%
Yale.....net prices
Delta Flat Key.....30%
L. & C. Round Key Latches.....30&10%
L. & C. Flat Key Latches.....33⅓&10%
Romer's Night Latches.....15%
Brooklyn Latches.....50&10%
Shepardson or U. S.....35%
Seed's N. Y. Hasp Lock.....35%

Padlocks—

List June 10, 1891.....50&2%
Norwich Lock Mfg. Co., old list...70&2%
Yale Lock Mfg. Co.'s.....net prices
Eagle.....35&2%
Eureka, Eagle Lock Co.....40&2%
Romer's, Nos. 0 to 91.....30%
Romer's Scandinavian, &c., Nos. 100 to 505.....15%
A. E. Delta.....40%
Champon Padlocks.....40%
Hotchkiss.....30%
Star.....60%
Horseshoe.....₩ doz, $9, 40&10&10%
Barnes Mfg. Co.....40@40&10%
Nock's.....30%
Brown's Pat.....35%
Scandinavian.....90@90&10%
E. T. Fraim's Keystone Scandavian. Nos. 119, 120, 130 and 140.....90&10% Other Nos.....35%
Ames Sword Co. up to No. 150.....40%
Ames Sword Co. above No. 150.....50%
Slaymaker Barry & Co.
No. 1010 line.....35&2%
No. 41 line.....45&10%
No. 61 line.....50&5%
No. 21 line.....75%

Sash, &c.

Clark's, No. 1, $10; No. 2, $8 ₩ gr..33⅓%
Ferguson's.....33⅓%
Victor.....60&10&2%
Walker's.....10%
Attwell Mfg. Co.....25&33⅓%
Reading.....60%&10@60%&10&10%
Hammond's Window Springs.....40%
Common Sense, Jap'd, Cop'd and Br'sed.....₩ gr $4.00
Common Sense, Nickel Plated ₩ gr $10.00
Universal.....30%
Kempshall's Gravity.....60%
Kempshall's Model.....60@60&10%
Corbin's Daisy, list Feb. 15, 1886.....70%
Payson's Perfect.....60&10%
Hugunin's Sash Balances.....25&5&2%
Hugunin's New Sash Locks.....25&5&2%
Stoddard "Practical".....10%
Ives' Patent.....60&10@60&10&2%
Lieschе's, No. 100, ₩ gr $8; 105, $10.....30%
Davis, Bronze, Barnes Mfg. Co.....50%
Champion Safety, list January, 1889..70%
Security.....70%
Giant, list Jan., 1892.....70&2%

Lumber Tools—See Tools, Lumber

Lustre—

Four-ounce Bottles....₩ doz, $1.75; ₩ gross.....$17 00

Machines.

Boring—

	Without Augers.	Upright.	Angular.
Douglas	$5.50	$6.75	.....50%
Snell's, Rice's Pat.	5.50	6.75	.40&10&10%
Jennings	5.50	6.75	.45&45&10%
Other Machines	2.35	2.75	.....
Phillips' Patent with Augers	7.00	7.50	.....
Miller's Falls	7.50	.....	.....35%

Fluting.

Knox, 4½-inch Rolls.....$3.25 each } 35%
Knox, 6-inch Rolls.....$3.60 each }
Eagle, 3½-inch Roll, $2.15.....35%
Eagle, 5½-inch Roll, $2.85.....35%
Crown, 4½ in., $3.50; 6 in., $4.00; 8 in., $6.50 each.....35%
Crown Jewel 6 in.....$3.50 each, 35%
American, 5 in., $3.00; 6 in., $3.40; 7 in., $4.50 each.....35%
Domestic Fluter.....each, $1.50
Geneva Hand Fluter, White Metal ₩ doz $12, 25%
Crown Hand Fluter, Nos. 1, $15.00; $12.50; 3, $10.00.....30%
Shepard Hand Fluter, No. 85 ₩ doz 18 00.....40%
Shepard Hand Fluter, No. 110 ₩ doz $11.00.....40%
Shepard Hand Fluter, No. 95 ₩ doz $8.00.....40%
Clark's Hand Fluter, ₩ doz $15.00.....35%
Combined Fluter and Sad Iron, ₩ doz $15.00.....30%
Buffalo ₩ doz $10.00.....10%

Hoisting—

Moore's Hand Hoist, with Lock Brake.....30%
Moore's Differential Pulley Block...40%
Energy Mfg. Co's.....25%
Sure Grip Steel Tackle Blocks.....25%

Washing—

Anthony Wayne, ₩ doz No. 1, $51 No. 2, $45; No. 3, $42.
Western Star ₩ doz No. 2, $45 No. 3 48.

Mallets.
Hickory ..... 20&10@20&10&10%
Lignumvitæ ..... 20&10@20&10&10%
G. & L. Block Co., Hickory & L. V. ..... 20@30&10%

Mattocks. Regular list. ..... 60&10@60&10&5%

Measures—
Standard Fiberware, No. 1, peck, ₩ dozen, $4; ½-peck, $3.50.

Meat Cutters—See Cutters, Meat.

Menders, Harness—
Per doz. $2.00

Mills.
Coffee—
Box and Side, List Jan. 1, 1888. 60@60&10%
Net prices are often made which are lower than above discount.
American, Enterprise Mfg. Co. 20&10@30%
The Swift, Lane Bros. ..... 20&10%

Mincing Knives—See Knives, Mincing.

Molasses Gates—See Gates, Molasses.

Money Drawers—See Drawers, Money.

Mowers, Lawn.
Pennsylvania, New Model, Excelsior, Continental, &c. ..... 60@60&5%
Philadelphia ..... 60&10%
Perfection ..... 60&10&10%
Easy ..... 60&10@60&10&5%
Bay State ..... 60&10@60&10&5%
Other Machines ..... 60&10&5@70%

Muzzles—
Safety ..... ₩ doz, $3.00, 25%

Nails,
Cut and Wire. See Trade Report.
Wire Nails, Papered.
Association list, July 15, '89. 75&10@80%
Tack Mfrs.' list ..... 70@70&10%
Wire Nails, Standard Penny.
Card June 1 '89 base ..... $1.95 @ $2.00

Horse—

	Nos. 6	7	8	9	10
Ausable	.23¢	26¢	25¢	24¢	23¢.
					40&5&5&2%
Clinton, Fin.	.19¢	17¢	16¢	15¢	14¢ .30&10%
Essex	.28¢	26¢	25¢	24¢	23¢.
					40&10&5&2%
Lyra	.19¢	17¢	16¢	15¢	14¢ .40&5%
Snowden	.19¢	17¢	16¢	15¢	14¢. 40&5%
Putnam	.23¢	21¢	20¢	19¢	18¢.
	1000 ℔ in year 15%				
Vulcan	.23¢	21¢	20¢	19¢	18¢ 25%
Northwest'n.	26¢	23¢	22¢	21¢	20¢.
					25&5@25&10%
A. C.	.25¢	23¢	22¢	21¢	21¢.
					25&10@33⅓&25%
C. B.-K.	.25¢	23¢	22¢	21¢	21¢.
					25&10@33⅓&25%
Maud S.	.25¢	23¢	22¢	21¢	21¢.
					40&10&5%
Champlain	.23¢	26¢	25¢	24¢	23¢.
					40&5&5&2%
Saranac	.23¢	21¢	20¢	19¢	18¢. 40&5%
Champion	.25¢	23¢	22¢	21¢	20¢.
					10&10&10%
Capewell	.19¢	18¢	17¢	16¢	16¢.
Anchor	.23¢	21¢	20¢	19¢	18¢ 35%
Western	.23¢	21¢	20¢	19¢	18¢. ... 50%
Empire Bronzed					14 ₩ ℔.

Picture—
Brass Head, Sargent's list ..... 50&10&10%
Brass Head, Combination list ..... 50&10%
Porcelain Head, Sargent's list. 50&10&10%
Porcelain Head, Combination list. 40&10%
Niles' Patent 40%

Nail Pullers.—See Pullers, Nail.

Nail Sets.—See Sets, Nail.

Nut Crackers.—See Crackers, Nut.

Nuts—List Dec. 18, 1889.

	Square.	Hex.
Hot Pressed	5.35¢	5.95¢ off list.
Cold Punched	5.00¢	5.10¢ off list.

In packages of 100 ℔, add 1-10¢ ₩ ℔, net; in packages less than 100 ℔, add ½¢ ₩ ℔, net.

Oakum—
Best or Government ..... ₩ ℔ 7@7½¢
U. S. Navy ..... ₩ ℔ 6@6½¢
Navy ..... ₩ ℔ 5½@6¢

Oilers—
Zinc and Tin ..... 65&10@70&5%
Brass and Copper ..... 50&10@50&10&5%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz. 10@10&5%
Malleable, Hammers, Old Pattern, same list 40%
Prior's Pat. or "Paragon" Zinc. 60&10&10%
Prior's Pat. or "Paragon" Brass. 50%
Olmstead's Tin and Zinc 60%
Olmstead's Brass and Copper 50%
Broughton's Zinc 60%
Broughton's Brass 50%
Gem P. D. & Co. ..... ₩ gro. $2
Steel, Draper and Williams 50%

Openers, Can.
Messenger's Comet ..... ₩ doz $3.00, 25%
American ..... ₩ gross $2.75@$3.00
Duplex ..... doz 25¢, 15@20%
Lyman's ..... ₩ doz $2.75, 20%
No. 4 French ..... ₩ doz $2.25, 55@60%
No. 5, Iron Handle ..... ₩ gr $6.00, 45&50%
Eureka ..... ₩ doz $3.50, 10%
Sardine Scissors ..... ₩ doz $2.75@3.00
Star ..... ₩ doz $2.75
Sprague, No. 1, $2.00 2, $2.25; 3, $2.50. 50&10&10%
Excelsior No. 1 $2.50; No. 2, $1.50. ..40%
World's Best, ₩ gross, No. 1, $12.00. No. 2, $24.00; No. 3, $36.00. ..... 50&10%
Universal, ₩ doz $3.00. ..... 55&5%
Domestic, ₩ doz $2.50. ..... 45%
Champion ₩ doz $3.00. ..... 50%

Packing, Steam—
Rubber—
Standard ..... 60&5@65%
Extra ..... 50@50&5%
N. Y. B. & P. Co., Standard 50%
N. Y. B. & P. Co., Empire 60%
N. Y. B. & P. Co., Salamander 25%
Jenkins' Standard, ₩ ℔ 80¢ ... 25@25&5%

Miscellaneous—
American Packing ..... 10¢@11¢ ₩ ℔
Russia Packing ..... 14¢ ₩ ℔
Italian Packing ..... 13¢@14¢ ₩ ℔
Cotton Packing ..... 15¢@17¢ ₩ ℔
Jute ..... 7¢@8¢

Pails.
Galvanized Iron—

	Quarts	10	12	14
Hill's Light Weight, ₩ doz.		$2.75	3.00	3.25
Hill's Heavy Weight, ₩ ds.		3.00	3.25	3.75
Helwig's		2.50	2.75	3.00
Sidney Shepard & Co.		2.25	2.35	3.00
Iron Clad		2.50	2.75	3.00
Fire Buckets		2.75	3.25	3.50

Buckets, see Well Buckets.
Indurated Fibre Ware—35%
Star Pails, 12 qt ..... ₩ doz $5.40
Stable and Milk, 14 qt. ..... ₩ doz $6.00
Fire Pails, deep ..... ₩ doz $5.40
" round bottom ..... ₩ doz $7.80
Standard Fibre Ware—

	Plain.	Decor'd
Water Pails, 12 qt., per doz.	$4.00	$4.50
Dairy Pails, 14 qt., per doz.	4.50	5.00
Fire Pails, No. 1, 12 qt. per doz	4.50	
Fire Pails, No. 2, 14 qt. per doz	5.00	
Sugar Pails	6.00	6.50
Horse Pails	5.00	
Buggy Pails	4.00	
Slop Jars (bal. trap)	8.00	9.00
Chamber Pails, 14-qt.	6.50	7.50

Pans.
Dripping.
Smalls ises ..... ₩ ℔ 6¾¢
Large sizes ..... ₩ ℔ 5¾¢
Silver & Co. (Covered) 40%
Fry—
Standard List:

No.	0	1	2	3	4
₩ doz.	$3.00	$3.75	$4.25	$4.75	$5.25
No.	5	6	7	8	
₩ doz.	$6.00	$7.00	$8.00	$9.00	

Polished, regular goods ..... 75@75&10%
Acme Fry Pans ..... 60&10%
Dust—
Steel Edge, No. 1 ..... ₩ doz $1.75

Paper and Cloth—
Sand and Emery—
List April 19, 1886 ..... 50@50&10%
Sibley's Emery and Crocus Cloth 30%

Parers.
Apple.
Advance ..... ₩ doz $4.75
Baldwin ..... ₩ doz 5.25
Bonanza ..... each 5.00
Daisy ..... ₩ doz 4.00
Dandy ..... each 7.50
Eclipse ..... ₩ doz 4.25
Eureka, 1885 ..... each 16.00
Family Bay State ..... ₩ doz 12.00
Favorite ..... ₩ doz 5.00
Gold Medal ..... ₩ doz 4.00
Ideal ..... ₩ doz 4.00
Improved Bay State .. ₩ doz $7.00 @ 30.00
Little Star ..... ₩ doz 4.50
Monarch ..... ₩ doz 13.50
New Lightning ..... ₩ doz 5.50
Oriole ..... ₩ doz 4.00
Penn ..... ₩ doz 4.00
Perfection ..... ₩ doz 4.00
Pomona ..... ₩ doz 4.00
Rocking Table ..... ₩ doz 6.00
Turn Table ..... ₩ doz 4.50
Victor ..... ₩ doz 13.50
Waverly ..... ₩ doz 4.00
White Mountain ..... ₩ doz 4.00
75 ..... ₩ doz. 4.25
78 ..... ₩ doz. 7.00
Potato—
White Mountain ..... ₩ doz $4.50
Antrim Combination ..... ₩ doz $5.50
Hoosier ..... ₩ doz $13.50
Saratoga ..... ₩ doz $5.50

Pencils—
Faber's Carpenters' ..... high list 50%
Faber's Round Gilt ..... ₩ gro $5.25
Dixon's Lead ..... ₩ gro $4.50
Dixon's Lumber ..... ₩ gro $6.75
Dixon's Carpenters' 10%

Picks—
Railroad or Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00 ..... 60&10@60&10&5%

Picture Nails.—See Nails, Picture.

Pinking Irons.—See Irons, Pinking.

Pins.
Box—
Humason, Beckley & Co.'s ..... 60&10%
Sargent & Co's ..... $17 and $18 ..... 60&10%
Peck, Stow & W Co. ... 50&10&50&10&5%
Curtain—
Silvered Glass ..... net
White Enamel ..... net
Escutcheon.
Iron, list Nov. 11, 1885 .. 50&10@50&10&5%
Brass ..... 50@60&5%

Pipe, Wrought Iron—
List September 18, 1889.
1¼ and under, Plain ..... 57½@60%
1¼ and under, Galvanized ..... 47½@50%
1½ and over, Plain ..... 67½@70%
1½ and over, Galvanized ..... 55@57½%
Boiler Tubes,
Sizes up to 2¾ in. inclusive 55%
Sizes 3 in. and larger 65%
Casing 55%
Inserted Joints Casing 50%
Steel Boiler Tubes 30%

Planes and Plane Irons—
Wood Planes—
Molding ..... 40&10%
Bench, First Quality ..... 50&10%
Bench, Second Quality ..... 55&10%
Bailey's (Stanley R. & L. Co.). ... 5%&10%
Iron Planes—
Bailey's (Stanley R. & L. Co.) ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 25&10%
Steer's Iron Planes ..... 35@35&10%
Meriden Mal. Iron Co.'s ..... 40@40&10%
Davis's Iron Planes ..... 40@40&10%
Birmingham Plane Co. ..... 50@50&10%
Gage Tool Co.'s Self-Setting ..... 20&10&10%
Chaplin's Iron Planes ..... 40@40&10%
Sargent's ..... 20&10@20&10&10%
Standard Tool Co. ..... 50@50&5%
Plane Irons—
Butcher's ..... $5.00@$5.25 to £
Buck Bros 30%
Auburn "Thistle" ..... } ..... 20&10%
Ohio ..... }
Sandusky ..... }
S. & I. J. White 25%
Stanley R. & L. Co ..... 50&10%

Plates.
Fellow ..... ₩ ℔ 6¢@6½¢

Pliers.
Button's Patent ..... 50@50&10%
Hall's No. 2, 5 in., $13.50; No. 4, 7 in. $21.00 ₩ doz ..... 20&10@33⅓%
Humason & Beckley Mfg. Co. 50@50&10%
Lindsay's Giant 40%
Gas Pliers 60%
Gas Pliers, Custar's Nickel Plated. 60&5%
Eureka Pliers and Nippers 40%
Russell's Parallel 25%
P. S. & W. Cast Steel 50%
P. S. & W. Tinners' Cutting Nippers, add 6% dis 10%
Carew's Pat. Wire Cutters 20%
Morrill's Parallel, ₩ doz, $12.00. 30&5%
Cronk's 8 in., $15.00; 10 in. $21.00, 50@50&5%
Cronk's Button Pattern ..... 50&10&60%
Cronk's Carrier Pliers ..... 60@60&5%

Plumbs and Levels—
Regular List ..... 75&10@75&10&5%
Stanley's Duplex ..... 20&10%
Stanley's Handy ..... 20&10%
Disston's 50%
Pocket Levels ..... 70&10@70&10&10%
Davis Iron Levels 30%
Davis' Inclinometers ..... 10&10%

Poachers.
Egg.
Buffalo Steam Egg Poachers, ₩ doz, No. 1, $6.00; No. 2, $9.00 ..... 25%
Silver & Co., 6-Ring. ₩ doz $4; 8-Ring $3

Pokes, Animal—
Bishop's I. X. L. ..... ₩ doz $6.00
Bishop's O. K. ..... ₩ doz $5.25
Bishop's Pioneer ..... ₩ doz $3.75
Bishop's American ..... ₩ doz $2.75
Eagle, Double Stale ..... ₩ doz $5.75
Eagle, Single Stale ..... ₩ doz $3.75
Buckeye, Single Stale ..... ₩ doz $2.75

Police Goods.
R. I. Tool Co., Handcuffs, $15.00 ₩ doz 10%
R. I. Tool Co., Leg irons, $25.00 ₩ doz 10%
Tower's 25%
Daley's Improved Handcuffs: 2 Hands, Polished, ₩ doz $48.00; Nickeled, $57.00: 3 Hands, Polished, ₩ doz $72.00; Nickeled, $84.00. ..... 25%
J. P. Lovell's Police Goods 25%

Polish, Metal.
Prestoline 30%
Prestoline Paste 33⅓%
Gaston's Silver Compound 33⅓%

Polish, Stove.
Joseph Dixon's ..... ₩ gro $6.00, 10%
Gem ..... ₩ gro $4.50, 10%
Gold Medal ..... ₩ gro $6.00, 25%
Mirror ..... ₩ pro $6.00, —%
Lustro ..... ₩ gro $4.75
Ruby ..... ₩ gro $3.75
Rising Sun, 5 gro lots ..... ₩ gro $5.50
Dixon's Plumbago ..... ₩ ℔ 8¢
Boynton's Noon Day, ₩ gro 13.00
Parlor Pride Stove Enamel. ₩ gro
Yates' Liquid, 2 3 5 10 gal. ... ₩ gal ...$0.80 .70 .60 .50
Yates Standard Paste Polish, 10-℔ cans, ₩ ℔ 12½¢
Jet Black ..... ₩ gro $3.50
Japanese ..... ₩ gro $2.50
Fireside ..... ₩ gro $2.00
Diamond O. K. Enamel ..... ₩ gro $19.00
Bonnell's Liquid Stove Polish. ₩ gro $9.00
Bonnell's Paste Stove Polish. ₩ gro $6.00
Black Eagle Benzine Paste, 5 and 10 ℔ cans ..... 12½¢
Black Jack Water Paste, 5 and 10 ℔ cans ..... 12½¢
Nickel Plate Paste ..... ₩ gro $6.00
Crown Paste ..... ₩ gross, $7.20
Crown Paste, in 5 and 10 ℔ pails ₩ ℔ 12¢
Black Flag ..... ₩ gross, $7.20
Black Flag, 5 and 10 ℔ pails ..... ₩ ℔, 12¢
Black Flag, liquid, in bottles, ₩ gro. $8.00
Diamond Rock Nickel Cleaner. ₩ gro $10.20

Poppers, Corn—
Round or Square, 1 qt. ₩ gr $10.00@10.50
Round or Square, 1½ qt. ₩ gr $15@15.50
Round or Square, 2 qt. ₩ gr $18.50@19.00

Post Hole and Tree Augers and Diggers—See Diggers, Post Hole, &c.

Potato Parers—See Parers, Potato.

Pots.
Glue—
Tinned ..... 40&10@40&10&5%
Enameled ..... 40&10@40&10&5%
Family, Howe's "Eureka" 40%
Family, L. F. C.'s "Handy" 50%

Presses.
Fruit and Jelly—
Enterprise Mfg. Co. ..... 30&10@30%
Henis ..... ₩ doz $3.50
Shepard's "Queen City" 40%
Silver & Co. ..... ₩ doz $2.75

Pruning Hooks and Shears.—See Shears.

Pullers.
Nail.
Scranton ..... ₩ doz $13.00, 33⅓%
Curtiss Hammer ..... ₩ doz $9.00
Giant, No. 1 ..... ₩ doz. $13.00, 10%
Giant, No. 2 ..... ₩ doz, $15.00, 10%
Pelican ..... ₩ doz, $9.00, 25%
Eclipse ..... each, $2.00 net

Pulleys—
Hot House, Awning, &c. ..... 60&10%
Japanned Screw ..... 60&10%
Brass Screw ..... 60&10%
Japanned Side ..... 60&10&10%
Japanned Clothes Line ..... 60&10%
Empire Sash Pulley ..... 55@60%
Moore's Sash, Anti-Friction 50%
Hay Fork, Solid Eye, $4.00; Swivel, $4.50 ..... 50&10@50&10&5%
Hay Fork, "Anti-Friction," 5 in. Solid, $5.70 ..... 50%
Hay Fork, "T" Common and Pat. Bushed 30%
Hay Fork, Tarbox Pat. Iron 20%
Hay Fork, Reed's Self-Lubricating 50%
Shade Rack 45%
Tackle Blocks ..... See Blocks
Moore's Anti-Friction 5 in. Wheel, ₩ doz $12.00 ..... 40%

Pumps—
Cistern, Best Makers ..... 60@60&10%
Pitcher Spout, Best Makers ..... 67½@70%
Pitcher Spout, Cheaper G'ds. 75@75&10%

Punches—
Saddlers' or Drive, good, ₩ doz ... 60@60%
Bemis & Call Co.'s Cast Steel Drive. 50&5%
Bemis & Call Co's Springfield Socket. 50&5%
Spring, good quality ..... ₩ doz $2.50@2.60
Spring, Leach's Pat. 15%
Bemis & Call Co.'s Spring and Check .40%
Solid Tinners', P. S. & W. Co., ₩ doz $1.44, 55%
Tin'rs' Hollow Punches P. S. & W. Co. 30&5%
Rice Hand 1 unches 15%
Avery's Revolving 40%
Avery's Saw-Set and Punch. See Saw Sets.

Rail—
Sliding Door, Wr't Brass, ₩ ℔ 35¢ 15%
Sliding Door, Bronzed Wr't Iron .. ₩ ft. 7¢
Sliding Door, Iron, Painted, ₩ foot 4¢, 40%
Barn Door, Light, In. ½ ¾ ⅞
Per 100 feet $2.00 2.50 3.1½, 10%
B. D. for N. E. Hangers—

	Small.	Med.	Large.
Per 100 set	$2.15	2.70	3.35 net

Terry's Steel Rail, ₩ foot ..... 4½¢
Victor Track Rail, 7¢ ₩ foot ..... 50&5%
Carrier, double braced, Steel Rail. ₩ foot ..... 4@4½¢
Moore's Wrought Iron 20%

Rakes—
Cast Steel, Association goods ..... 60%@70%
Cast Steel, outside goods ..... 60&10&10@70&5%
Malleable ..... 70@70&5%
Gibbs Lawn Rake ..... ₩ doz $4.00
Canton Lawn Rake ..... ₩ doz $3.75
Favorite Lawn Rake ..... ₩ doz $4.40
Ft. Madison Prize Bow Brace and Peerless 60%
Fort Madison Steel Tooth Lawn Rake, $6.00 ..... 25%

Razors—
J. R. Torrey Razor Co 30%
Wostenholme and Butcher, $10 to $..10%
Jordan's AAAI, new list ..... net
Jordan's Old Faithful, new list, ... net
Galvanic ..... ₩ doz $15.00

Razor Strops—See Strops, Razor.

Rings and Ringers.
Bull Rings—
Union Nut Co. 55%
Sargent's ..... 65%&10@70&5%
Hotchkiss' low list 30%
Humason, Beckley & Co.'s ..... 70&10%
Peck, Stow & W. Co's. .50&10&50&10&10%
Ellrich Hdw. Co., White Metal, low list. 50@50&10%
Hog—
Top of the Hill Ringers ..... ₩ doz $2.00
Top of the Hill Rings ..... ₩ doz $1.25
Hill's Improved Ringers ..... ₩ doz $1.25
Hill's Old Style Ringers ..... ₩ doz $1.12½
Hill's Tones ..... ₩ doz $2.00
Hill's Rings ..... ₩ doz bxs $1.00
Perfect Rings ..... ₩ doz bxs $1.50
Perfect Ringers ..... ₩ doz $2.15@$3.50
Blair's Hog Ringers ..... ₩ doz $2.00
Blair's Hog Rings ..... ₩ doz 90¢@$1.00
Champion Ringers ..... ₩ doz $2.00
Champion Rings, Double ..... ₩ doz $2.25
Brown's Ringers ..... ₩ doz $2.00
Brown's Rings ..... ₩ doz $1.15@1.25
Electric Hog Rings .... ₩ doz boxes $1.50
Electric Hog Ringers ..... ₩ doz $2.00

Rivets and Burrs—
Iron, list Nov. 17, '87 ..... 40%
Copper ..... 60&10@60&10&5%
Coppered Iron, Bettina Brand 40%

Rivet Sets—See Sets.

Rods—
Stair, Brass ..... 25&2%
Stair, Black Walnut ..... ₩ doz 40¢

Rollers—
Barn Door, Sargent's list ..... 60&10&10%
Acme Moore's Anti-Friction 50%
Union Barn Door Roller 70%

Rope.
Manila, 7-16 in. diam. and larger ₩ ℔ 12¼¢
Manila ..... ⅜ in. ₩ ℔ 12¾¢
Manila ..... ¼ and 5-16 in. ₩ ℔ 13¼¢
Manila Tarred Rope ..... ₩ ℔ 11¾¢
Manila, Hay Rope ..... ₩ ℔ 12¼¢
Sisal ..... 7-16 inch and larger ₩ ℔ 10¾¢
Sisal ..... ⅜ in. ₩ ℔ 10¾¢
Sisal ..... ¼ and 5-16 in. ₩ ℔ 11¾¢
Sisal, Hay Rope ..... ₩ ℔ 10¾¢
Sisal, Tarred Rope ..... ₩ ℔ 9¾¢
Sisal, Medium Lath Yarn ..... ₩ ℔ 9¾¢
New Zealand .7-16 in. & larger ₩ ℔ 8¾¢
New Zealand ..¼ inch. ₩ ℔ 9¼¢
New Zealand, ¼ and 5-16 inch, ₩ ℔ 9¾¢
New Zealand, Hay Rope ..... ₩ ℔ 8¾¢
New Zealand, Tarred Rope. ... ₩ ℔ 8¼¢
Note.—Manufacturers' prices on above 1¢ ₩ ℔ less, f.o.b. factory—less 1½% for cash
Cotton Rope ..... ₩ ℔ 13¼@16¢
Jute Rope ..... ₩ ℔ 6¼@7¢
Wire—
List February, 1892.
A 1 kinds 45%

Rules—
Boxwood ..... 80&10&10%
Ivory ..... 50&50&10%
Starrett's Rules and Straight Edges, Steel ..... 35&10%

Sad Irons—See Irons, Sad.

Sand and Emery Paper and Cloth—See Paper and Cloth, Sand and Emery

Sash Cord—See Cord, Sash.

Sash Locks—See Locks, Sash.

Sash Weights—See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.

Saws—The following prices are often cut by jobbers.
Disston's Circular ..... 45@45&5%
Disston's Cross Cuts ..... 45@45&5%
Disston's Hand ..... 30@30&5%
Woodrough & McFarlin.
Hand, Panel and Rip ..... 25@25&5%
Narrow Champion Cross Cuts with Handles, ₩ foot ..... 18@20¢
Champion Thin Back Cross Cuts, ₩ foot ..... 26@28¢
Champion Extra Thin Back Cross Cuts, ₩ foot ..... 29@31¢
One Man Champion Cross Cuts, ₩ foot ..... 37@40
Wheeler, Madden & Clemson Mfg. Co.
Hand, Panel and Rip ..... 3@3&5%
Narrow Champion Cross Cuts with Handles, ₩ foot ..... 18@20¢
Champion Thin Back Cross Cuts, ₩ foot ..... 26@28¢
Champion Extra Thin Back Cross Cuts. ₩ foot ..... 29@31¢
One Man Champion Cross Cuts, ₩ ft. ... 37@40
Atkins' Circular Shingle and Heading ..... dis 50%
Atkins' Silver Steel Diamond X Cuts ₩ foot 70¢
Atkins' Special Steel Dexter X Cuts ₩ foot 50¢
Atkins' Special Steel Diamond X Cuts ₩ foot 32¢
Atkins' Champion and Electric Tooth X Cuts ..... ₩ foot 30¢
Atkins' Hollow Back X Cuts. ₩ foot 30¢
Atkins' Mulay, Mill and Drag 40%
Atkins' One-Man Saw, with handles, ₩ foot 40¢
Peace Circular and Mill ..... 45@45&5%
Peace Hand Panel and Rip ..... 2@2&5%
Peace Cross Cuts ..... 45@45&5%
Richardson's Circular and Mill. 45@45&5%
Richardson's ⅄ Cuts ..... 45@45&5%
Richardson's Hand, &c. ..... 25@25&5%
C. E. Jennings & Co., Hand, Panel and Rip ..... 25@25&10%

Hack Saws—

Griffin's, complete.....40&10@50%
Griffin's Hack Saw, Blades.....40&10@50%
Star Hack Saws and Blades.....35%
Eureka and Crescent.....25%

Scroll—

Lester, complete, $10.00.....25%
Rogers, complete, $4.00.....25%
Barnes' Builders' and Cab. Makers' $15.25%
Barnes' Scroll Saw Blades.....35%

Saw Frames—See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Scales—

Watch, Counter, No. 171, good quality, ₩ doz $21.00
Hatch, Tea, No. 161....₩ doz $6.75@$7.00
Union Platform, Plain.....$2.10@$2.90
Union Platform, Striped.....$3.40@$2.50
Chatillon's Grocers' Trip Scales 50%
Chatillon's Eureka.....25%
Chatillon's Favorite.....40%
Family, Turnbulls.....80@30&10%
Richie Bros.' Platform.....40%

Scale Beams—See Beams, Scale.

Scissors, Fluting.....45%

Scrapers—

Adjustable Box Scraper (S. R. & L. Co.) $4.50.....30&10%
Box, 1 Handle.....₩ doz $4.00, 10%
Box, 2 Handle.....₩ doz $6.00, 10%
Defiance Box and Ship.....20&10%
Foot.....50&10@60%
Ship, Common .....₩ doz $3.50 net
Ship, R. I. Tool Co.....10%

Screen Window and Door Frames—See Frames.

Screw Drivers—See Drivers, Screw.

Screws.

Bench and Hand—

Bench, Iron.....55&10@55&10&10%
Bench, Wood, Beech.....₩ doz $2.25
Bench, Wood, Hickory.....20&10%
Hand, Wood.....25&10@25&10&5%
Hand, Grand Rapids, list.....75%
Lag, Blunt Point, list Jan. 1, 1890..75&10%
Coach and Lag, Gimlet Point, list Jan. 1, 1890.....75@75&10%
Bed.....25&5%
Hand Rail, Sargent's.....60&&10%
Hand Rail, H. & F. Mfg. Co...70&10@75%
Hand Rail, Am. Screw Co.....75%
Jack Screws, Millers Falls list..50@50&5%
Jack Screws, P. S. & W.....35%
Jack Screws, Sargent...60&10@60&10&5%
Jack Screws, Stearns'.....40@40&10%

Cork—

Hunnason & Beckley Mfg. Co..40&10@50%
Williamson's.....33⅓@33⅓&25%
Howe Bros & Hulbert.....35%

Machine—

Flat Head, Iron.....55%
Round Head, Iron.....50%

Wood—

List January 1, 1891.

Flat Head Iron	70	%
Round Head Iron	65	%
Flat Head Brass	70	%
Round Head Brass	65	%
Flat Head Bronze	70	%
Round Head Bronze	65	%
Gorers' Drive Screws	82½&5	%

Extra 10 & 10&5 % often given.

Scroll Saws—See Saws, Scroll.

Scythes.

Grain.....40&5@40&10%
Grass.....40&10@50%

Scythe Snaths—See Snaths, Scythe

Seals.

Awl and Tool.

Aiken's Sets, Awls and Tools, No. 90, ₩ doz $10.00.....55&10%
Fray's Adj. Tool Hdls., Nos. 1, $12; 2, $18; 3, $12; 4, $9.....35@25&10%
Miller's Falls Adj. Tool Hdls., Nos. 1, $12, 2, $18.....25%
Mowry's Combination Haft...₩ doz $6.50
Stanley's Excelsior: No. 1, $7.50; No. 2, $4.00; No. 3, $5.50.....50&10%
Common Brad Sets, No. 42, $10.50; No. 43, $12.50..70&10&5%

Nail—

Square.....₩ gr., $4 00@$4.25
Round.....₩ gr. $3.25
Buck Bros.....27½%
Cannon's Diamond Point..₩ gr.,$12, 20%

Rivet,

Regular list.....50&10%

Saw—

Stillman's Genuine...₩ doz $5.00@7.75, 40&5%
Stillman's Pattern Hand, ₩ doz $3.25; Cross Cut, 5.25.....45@50%
Common Lever .....₩ doz $2.00, 45@50%
Merrill's No. 1, $15.00; Nos. 3&4, $24.00.....40&10@50%
Leach's. .No. 0, $8 00; No. 1, $15, 15@20%
Nash's .....50&10@50&10&10
Hammer, Hotchkiss.....$5.50, 10%
Hammer, Semis & Call Co.'s new Pat. .....50&5%
Semis & Call Co.'s Lever and Spring Hammer.....50&5%
Semis & Call Co.'s Plate.....10%
Semis & Call Co.'s Cross Cut 12½%
Aiken's Genuine.....$15.00, 50&10@60%
Aiken's Imitation.....$7.00, 55&5%
Hart's Pat. Lever 20%
Disston's Star. 50%
Leopold.....40&10@60%
Atkin's Lever... .....₩ doz No. 1, $6.00
Atkin's Criterion.....₩ doz No. 1, $6.00
Croissant (Keller), No. 1, $15.00; No. 2, $24.00.....40&10%
Avery's Saw Set and Punch.....50%
Chieftain Co.'s Superior.....₩ doz $7.00
Chieftain Co.'s Royal.....₩ doz $7.50
Crescent.....₩ doz $5.00

Sharpeners, Knife.

Parkins.

Applewood Handles...₩ doz $6.00, 40%
Rosewood or Cocobo s.₩ doz $900 40%

Shaves, Spoke

Iron.....45%
Wood.....30%
Bailey's (Stanley R. & L. Co.).....40&10%
Stearns'.....30&10%
Cincinnati.....25&10%
Goodell's, ₩ doz $9.00.....25%

Shears—

American (Cast) Iron...75&10@75&10&5%
Barnard's Lamp Trimmers...₩ doz $3.75
Tinners'.....20&2%
Seymour's, List, Dec., 1881. 60&10&10@60&10&10&5%
Heinisch's, List, Dec., 1881. 60&10&10@60&10&10&5%
Heinisch's Tailor's Shears.....33⅓%
Cast Steel Trimmers: First quality .....30@30&10%
Second quality.....30&10@30&10&10%
Acme Cast Shears.....10&10%
Diamond Cast Shears.....10%
Clipper.....10&10%
Victor Cast Shears.....75&10@75&10&5%
Howe Bros. & Hulbert, Solid Forged Steel.....40%
Chicago Drop Forge & F. Co., Solid Steel Forged.....60%
Davenport Cutlery Co .....60@60&10%
Clauss Shear Co., Japanned.....70%
Clauss Shear Co., Nickeled, same list. 60%
Galvanic, 3½ to 9 in, ₩ doz, $1.00 ₩ inch

Pruning Shears and Hooks.

Disston's Combined Pruning Hook and Saw.....₩ doz $18.00, 20&10%
Disston's Pruning Hook, ₩ doz $12.00, 20&10%
E. S. Lee & Co.'s Pruning Tools.....40%
Pruning Shears, Henry's Pat, ₩ doz $3.75@4.00
Henry's Pruning Shears, ₩ doz $4.25@4.50
Wheeler, M. & C. Co.'s Combination, ₩ doz $12.00, 20%
Dunlap's Saw and Chisel, ₩ doz $8.50, 30%
J. Mallinson & Co., No. 1, $5.25; No. 2 7.25
P., S. & W. Co.....60%

Tinners', &c.—

Shears and Snips (P. S. & W.).....20@25%
Snips, J. Mallinson & Co.....33⅓%

Sheaves—

Sliding Door—

M. W. Co., list July, 1888..50&10@60&5%
R. & E., list Dec. 18, 1885.....55&20%
Corbin's list..... .....60&10&2%
Patent Roller.....60&10&2%
Patent Roller, Hatfield's.....75%
Russell's Anti-Friction, list Dec. 18, 1885.....60&2%
Moore's Anti-Friction.....50%

Sliding Shutter—

R. & E. list Dec. 18, 1885 .....60&10&2%
Sargent's list.....60&10%
Reading list .....60&10&10%

Shells—

First quality 4, 8, 10 and 12 gauge 25&10&2%
First quality, 14, 16 and 20 gauge ($10 list).....30&10&2%
Prize .....40&2%
Star, Club, Rival and Climax brands. .....33⅓&10&2%
Selbold's Comb. Shot Shells.....15&2%
Brass Shot Shells, 1st quality .....60&2%
Brass Shot Shells, Club, Rival, Climax.. 65&2%

Shells Loaded—

Standard List, July 19, 1890..... 40&10&10@40&10&10&5%

Ship Tools—

L. & I. J. White.....20&5%

Shoes, Horse, Mule, &c.—

Horse—

Burden's, Perkins', Phoenix and Bryden's Boss, at factory. $4.00
Bryden's Frog Pressure, at factory.$5.00

Mule—

Add $1 ₩ keg to above prices.

Ox, Wrought—

Ton lots.....₩ ℔ 9¢
1000 ℔ lots.....₩ ℔ 9½¢
500 ℔ lots.....₩ ℔ 10¢

Shot—

	Ton lots	Small lots
Drop, up to B, 25-℔ bag	$1.30	$1.35
Drop, up to B, 5-℔ bag	.30	.35
Drop, B and larger, 25-₩ bag	1.55	1.60
Drop, B and larger 5-℔ bag	.40	.40
Buck and Chilled, 25-℔ bag	1.55	1.60
Buck and Chilled, 5-℔ bag	.40	.40
Dust Shot, 25-℔ bag	1.95	2.00
Dust Shot, 5-℔ bag	.45	.45

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1, 1885.....20%
NOTE.—Jobbers frequently give 5@7½% extra on above.
Griffith's Black Iron.....50&10%
Griffith's C. S.....60@60&10%
Griffith's Solid C. S. R. R. Goods.....20%
St. Louis Shovel Co.....20@20&7½%
Hussey, Binns & Co.....15@25%
Hubbard & Co.....20@20&7½%
Lehigh Mfg. Co.....60&10%
R. M. Myers Co.....30%
Payne Pettebone & Son.....33⅓&25%
Remington's (Lowman's Pat.)30&10@40%
Rowland's, Black Iron.....50&10%
Rowland's Steel.....60&5@60&10%

Shovels and Tongs—

Iron Head .....60&10@60&10&5%
Brass Head.....60&10&10%

Sieves—

Mann's Tin Rim.....50&25%
Buffalo Metallic, S. S. & Co.....50&25%
Shaker (Barler's Pat.) Flour Sifters.... ₩ doz $2.00; ₩ gr $21.60
Electric.....₩ gr $21.00
L. & W. Sifters.....₩ doz 2.00
Hunter's.....₩ doz $2.00
Smith's Adjustable Sifters .....₩ doz $2.00
Smith's Adjustable Milk Strainer. .....₩ doz $2.00
Smith's Adjustable T. & C. Strainer. .....₩ doz $1.25

Sieves, Wooden Rim—

	Iron.	Plated
Mesh 18, Nested, ₩ doz..	80¢	$1.00
Mesh 20, Nested, ₩ doz..	95¢	1.10
Mesh 24, Nested, ₩ doz..	$1.15	1.25

Skeins, Thimble—

Western list.....75&5@75&10%
Columbus Wrt. Steel..Special net prices
Coldbrookdale Iron Co.....60%
Seneca Falls Pattern.....60%
Utica P. S. T. Skeins.....60%
Utica Turned and Fitted.....35%

Slates—

School, by case.....50&10@50&10&10%

Snaps, Harness, &c.—

Anchor (T. & S. Mfg. Co.).....65%
Fitch's (Bristol).....50&10%
Hotchkiss.....10%
Andrews.....50%
Sargent's Patent Guarded.....70&10&10%
German, new list.....40&10%
Covert.....50&10&5&2%
Covert, New Patent.....50&10&5&2%
Covert, New R. B.....60&10&5&2%
Covered Spring.....60&10&10%
E. Covert's Triumph.....33⅓%

Snaths, Scythe.

List.....50%

Soldering Irons—See Irons, Soldering.

Spittoons, Cuspidors, &c.

Standard Fiberware—

Cuspidors, 8¼-inch, ₩ doz., No. 5, $8; No. 5X $9.
Spittoons, Daisy, 8-inch, No. 1, $4; 10 and 11 inch, $6.

Spoke Shaves—See Shaves, Spoke.

Spoke Trimmers—See Trimmers, Spoke.

Spoons and Forks—

Tinned Iron—

Basting, Cen. Stamp. Co.'s list....70&10%
Solid Table and Tea, Cen. Stamp. Co.'s list.....70&10%
Buffalo S. S. & Co.....33⅓&2%

Silver-Plated—(4 mos. or 5% cash 30 days).

Meriden Brit. Co., Rogers.....40&15%
C. Rogers & Bros.....40&15%
Rogers & Bro.....40&15%
Reed & Barton.....40@40&5%
Wm. Rogers Mfg. Co.....40, 15&5%
Simpson, Hall, Miller & Co.....40, 15&5%
Holmes & Edwards Silver Co...40, 15&5%
L. Boardman & Son.....50&12½%

Miscellaneous.

Holmes & Edwards Silver Co.:
No. 67 Mexican Silver.....50&10&5%
No. 80 Silver Metal.....50&10&5%
No. 54 German Silver.....50&10&5%
No. 50 Nickel Silver.....50&10&5%
No. 49 Nickel Silver.....50&10&5%
Wm. Rogers Mfg. Co.
Rogers' Silver Metal.....50, 10&5%
18% Rogers' German Silver.....60&5%
22% Rogers' Nickel Silver. .....50&5%
German Silver.....50@50&5
German Silver, Hall & Elton..50&2% cash
Nickel Silver.....50&5@50&10&5% cash
Britannia.....60@60&5%
Boardman's N'ck'l Silver, list July 1, 1891 .....60&7½&5%
Boardman's Britannia Spoons, case lots.....60&5% cash

Springs—

Door.—

Torrey's Rod, 39 in ....₩ doz $1.20@1.25
Gray's, ₩ gr., $20.00.....25%
Bee Rod ₩ gr., $20.00.....20@25%
Warner's No. 1, ₩ doz, $2.50; No. 2, $3.30.....50@50&5%
Gem (Coil), list April 19, 1886.....10@15%
Star (Coil), list April 19, 1886...20@2&5%
Victor (Coil).....60&10@60&10&5%
Champion (Coil).....60&10@60&10&10%
Cowell's....No. 1, ₩ doz, $18.00; No. 2, $15.00.....50@50&10%
Rubber, complete, ₩ doz, $4.50...55&10%
Hercules.....50@50&10%

Carriage, Wagon, &c.—

Elliptic, Concord, Platform and Half Scroll.....60&10&10%
Cliff's Bolster Springs.....25%

Squares—

Steel and Iron, Nickel-Plated.....} .80&10@80&10&10%
Try Square and T Bevels...60&10@60&10&10%
Disston's Try Square and T Bevels.....50%
Winterbottom's Try and Miter.....30&10%
Starrett's Micrometer Caliper Squares 25%
Avery's Flush Bevel Squares.....40%
Avery's Bevel Protractor 50%

Squeezers.

Fodder.—

Blair's.....₩ doz $2.00
Blair's "Climax".....₩ doz $1.25

Lemon—

Porcelain Lined, No. 1....₩ doz $6.00. .....25&20%
Wood, No. 2.....₩ doz $3.00, 25%
Wood, Common.....₩ doz $1.70@1.75
Dunlap's Improved .....₩ doz $3.75, 30%
Sammis....No. 1, $5.00; No. 2, $9; 12, $18 ₩ doz.....25&10%
Jennings' Star.....₩ doz $2.50
The Boss.....₩ doz $2.50
Dean's..Nos. 1, ₩ doz $6.50; 2, $3.35; 3, $1.90; Queen, $2.50
Little Giant.....50@50&5%
King.....40&5%
Hotchkiss Straight Flash....₩ doz $12.00
Silver & Co., Glass.....₩ gro. $9.00
Manny Lemon Juice Extractor: Standard.....₩ doz $0.75@$1 00 Improved.....₩ doz $4.00

Standard Fiber Ware—See Ware, Standard Fiber.

Staples.

Blind—

Barbed, ½ in. and larger.....₩ ℔ 7@7½¢
Barbed, ¾ in. .....₩ ℔ 8@8½¢
Fence staples, Galvanized. } Same price as B'rb'd Wire. See Trd. Rep.
Fence Staples, Plain..... }

Steelyards... .....40&10@50.

Stocks and Dies—

Blacksmith's Waterford Goods.....33⅓@40%
Butterfield's Goods.....33⅓@40%
Lightning Screw Plate.....35@30%
Reece's New Screw Plates....33⅓@40%
Reversible Ratchet.....35@30%
Gardner.....35%

Stops, Bench.

Morrill's.....₩ doz $9, 50%
Hotchkiss's.....₩ doz $5. 10@10&10%
Weston's, No. 1, $10; No. 2, $9.25&10%
McGill's.....₩ doz $3.....35%
Cincinnati.....33⅓%
Terrell's Nos. 1 and 2, ₩ doz., $3; No. 3, $3.60.....30%

Stone—

Hindostan No. 1, 3¢; Axe, 3½¢; Slips No. 1, 4½¢
Sand Stone.....₩ ℔ 2½¢
Washita Stone, Extra.....₩ ℔ 22@25¢
Washita Stone, No. 1.....₩ ℔ 19@20¢
Washita Stone, No. 2.....₩ ℔ 12@13¢
Washita Slips, No. 1, Extra..₩ ℔ 44@46¢
Washita Slips, No. 1.....₩ ℔ 32@35¢
Arkansas Stone, No. 1, 4 to 6 in₩ ℔ $1.50
Arkansas Stone, No. 1, 6 to 9 in₩ ℔ $1.85
Turkey Oil Stone, 4 to 8 in.....₩ ℔ 40¢
Turkey Slips.....₩ ℔ $1.00@1.50
Lake Superior, Chase.....₩ ℔ 18¢
Lake Superior Slips, Chase.....₩ ℔ 20¢
Seneca Stone, Red Paper Brand..₩ ℔ 18@20¢
Seneca Stone, High Rounds..₩ ℔ 20@25¢
Seneca Stone, Small Wheels..₩ gro $24.00

Stove Polish—See Polish, Stove.

Stretchers, Carpet.

Cast Steel, Polished.....₩ doz $2.25
Cast Iron, Steel Points.....₩ doz 80¢
Socket.....₩ doz $1.75
Gullard's.....25@25&10%

Strops, Razor—

Genuine Emerson.....60@60&5%
Imitation " ....₩ doz $2.00, 20&10&5%
Torrey's.....30%
Badger's Belt and Com.....₩ doz $3.00
Lamont Combination.....₩ doz $4.00
Jordan's Pat. Padded, list Nov. 1,'89.50%
Electric.....List net

Stuffers or Fillers, Sausage—

Miles' "Challenge," ₩ doz $20, 50@50&5%
Perry .....₩ doz, No. 1, $15.00; No. 0, $21.00.....50&5@50&10%
Draw Cut No. 4, each $30.00.....30%
Enterprise Mfg. Co.....20&10@30%
Silver's.....40&10%

Sweepers, Carpet.

Bissell No. 5.....₩ doz $17.00
Bissell No. 7 New Drop Pan.₩ doz $19.00
Bissell, Grand.....₩ doz $36.00
Grand Rapids.....₩ doz $24.00
Crown Jewel, No. 1, $13.00; No. 2, $19.00; No. 3, $30.00
Magic.....₩ doz $15.00
Jewel.....₩ doz $17.00
Improved Parlor Queen, Nickeled.....₩ doz $27.00
Japanned.....₩ doz $24.00
Excelsior .....₩ doz $22.00
Garland .....₩ doz $18.00
Parlor Queen.....₩ doz $24.00
Housewife's Delight.....₩ doz $15.00
Queen.....₩ doz $16.00
Queen, with band.....₩ doz $18.00
King .....₩ doz $30.00
Weed, Improved.....₩ doz $18.00
Hub.....₩ doz $16.00
Cog-Wheel.....₩ doz $16.00
Easy.....₩ doz $22.00
Monarch.....₩ doz $32.00
Goshen.....₩ doz $21.00
Ladies' Friend.....₩ doz $15.00
Advance.....₩ doz $18.00
Supreme.....₩ doz $22.00

Tacks, Brads, &c.—

List October 19, 1889. Old established standard Weights Short Weight goods are sold at lower prices.

Carpet Tacks—

American, Blued	75 %
American, Tin'd and Cop'd	77½ %
Steel, Bright and Blued	72½ %
Steel, Tinned and Coppered	75 %
Swedes Iron, Blued	72½ %
Swedes Iron, Tinned	75 %
American Iron Tacks	72½ %

Swedes Iron Tacks—

S. S., Blued	75 %
S. S., Tinned	77½ %
Lanc., Blued	66⅔ %
Lanc., Tinned	72½ %

Gimp and Lace Tacks—

S. S., Blued	75 %
S. S., Tinned	77½ %
Lanc., Blued	66⅔ %
Lanc., Tinned	72½ %

Basket and Trimmers' Tacks—

Lanc	65 %
S. S	70 %
Hungarian Nails	66⅔ %
Miners' Tacks, S. S..	75 %
Miners' Tacks, Lanc.	70 %
Common and Patent Brads	66⅔ %
Leathered Tacks	50 %
Brush Tacks	50 %
Looking Glass Tacks	50 %
Picture-Frame Points	50 %
Finishing Nails	66⅔ %

Trunk and Clout Nails—

Black	66⅔ %
Tinned or Coppered	66⅔ %
Basket Nails	62½ %
Chair Nails	62½ %
Cigar-Box Nails	50 %
Tin Capped Nails	50 %

Regular discount 10&2½, cash. 10&10&10 % often given. On many of these goods extra

Miscellaneous—

D'bie-Point..120 count	85&10@85&10&10%
Double Point, 100 count	90%
Wire Carpet Nails	50&10%
Plymouth Rock Steel Carpet Tacks	25%
Wire Brads and Nails, see Nails, Wire.	
Steel-Wire Brads, R. & E. Mfg. Co.'s list	50&10%

Tapes, Measuring—

American.....40@40&25%
Spring.....40%
Chesterman's, Regular list.....25@30%

Thermometers—

Tin Case.....80@80&10%

Thimble Skeins—See Skeins.

Ties, Hale— St

Standard Wire, list.....50&10&5%

Tinners' Shears, &c.—See Shears Tinners', &c

Tinware—
Stamped, Japanned and Pieced, list Jan. 20 1887.....70&10@70&10&5%

Tire Benders, Upsetters, &c—
See Benders and Upsetters, Tire.

Tools.
Coopers'—
Bradley's.....30@20&5%
Barton's.....30&5%
I. & L. J. White.....30&5%
Albertson Mfg. Co.....25%
Beatty's.....30%
Sandusky Tool Co.....30@30&5%
Shaves, Cincinnati Tool Co.....30%
Lumber.
Ring Peavies, "Blue Line"...₩ doz $20.00
Ring Peavies, Common.....₩ doz $18.00
Steel Socket Peavies.....₩ doz $21.00
Mall. Iron Socket Peavies.....₩ doz $19.00
Cant Hooks, "Blue Line"..₩ doz $16.00
Cant Hooks, Common Finish..₩ doz $14.00
Cant Hooks, Mall. Socket Clasp, "Blue Line" Finish.....$16.00
Cant Hooks, Mall. Socket Clasp, Common Finish.....₩ doz $14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish.....₩ doz $14.00
Cant Hooks, Clip Clasp, Common Finish.....₩ doz $12.00
Hand Spikes....₩ doz 6 ft., $15.00; 8 ft., $20.00
Pike Poles, Pike & Hook, ₩ doz., 12 ft., $11.50; 14 ft., $12.50; 16 ft., $14.50; 18 ft., $17.50; 20 ft., $21.50.
Pike Poles, Pike only, ₩ doz, 12 ft., $10.00; 14 ft., $11.00; 16 ft., $13.00; 18 ft., $16.00; 20 ft., $20.00.
Pike Poles, not ironed, ₩ doz, 12 ft. $6.00; 14 ft., $7.00; 16 ft., $9.00; 18 ft., $12.00; 20 ft., $16.00.
Setting Poles, ₩ doz, 12 ft., $14.00; 14 ft., $15.00; 16 ft., $17.00
Swamp Hooks.....₩ doz $18.00
Saw.
Atkins' Perfection.....₩ doz $12.00
Atkins' Excelsior.....₩ doz $6.00
Atkins' Giant.....₩ doz $4.00

Tobacco Cutters—See Cutters, Tobacco.

Transom Lifters — See Lifters, Transom.

Traps—
Game—
Newhouse.....40@40&5%
Oneida Pattern.....70&10%
Game, Blake's Patent.....40&10&5%
Mouse and Rat—
Mouse Wood, Choker, ₩ doz holes, 9@10¢
Mouse, Round Wire.....₩ doz $1.50 10%
Mouse, Cage, Wire.....₩ doz $2.50, 10%
Mouse, Catch-'em-alive.....₩ ds $2.50 15%
Mouse, Bonanza.....₩ doz $0.90@$1.00
Rat, Decoy.....₩ gr $10.00, 10%
Ideal.....₩ gr $10.00
Cyclone.....₩ gr $5.25
Hotchkiss Metallic Mouse, 5-hole traps, ₩ doz., 90¢; in full cases, ₩ doz.....75¢
Hotchkiss Imp. Rat Killer..₩ gro $18.50
Hotchkiss New Rat Killer..₩ gro $16.50
Schuyler's Rat Killer.....₩ gro $15.00

Triers—
Butter and cheese.....25%

Trimmers, Spoke.
Bonney's.....₩ doz $10.00, 50%
Stearns'.....20&10%
Ives', No. 1, $15.00; No. 2, $12.00 ₩ doz. 55&10%
Douglas'.....₩ doz $9.00, 20%
Cincinnati.....25%

Trowels—
Lothrop's Brick and Plastering.....50&10&5@35%
Reed's Brick and Plastering.....15%
Disston's Br'k and Plastering.....25%
Peace's Plastering.....25%
Clement & Maynard's.....20%
Rose's Brick.....15@20%
Brade's Brick.....25%
Worrall's Brick and Plastering.....20%
Garden.....70%

Trucks, Warehouse, &c.—
B. & L. Block Co.'s list, '92.....40%

Tubes, Boiler—
See Pipe.

Twine—

Flax Twine—	BC.	B.
No. 9, ¼ and ½ ℔ Balls	25¢	31¢
No. 12, ¼ and ½ ℔ Balls	22¢	30¢
No. 15, ¼ and ½ ℔ Balls	20¢	29¢
No. 24, ¼ and ½ ℔ Balls	20¢	29¢
No. 36, ¼ and ½ ℔ Balls	18¢	28¢
No. 264, Mattrass, ¼ and ½ ℔ Balls	53@54¢	
Chalk Line, Cotton, ½ ℔ Balls		25¢
Mason Line, Linen, ½ ℔ Balls		55¢
2-Ply Hemp, ¼ and ½ ℔ Balls (Spring Twine)		15½¢
3-Ply Hemp, 1 ℔ Balls		16¢@16½¢
3-Ply Hemp, 1½ ℔ Balls		15¢@15½¢
Cotton Wrapping, 5 Balls to ℔		15¢@16¢
2, 3, 4 and 5-Ply Jute, ½ ℔ Balls		10¢
Wool		6½¢@8½¢
Paper		13¢@14¢
Cotton Mops, 6, 9, 12 and 15 ℔ to doz.		18¢

Vises—
Solid Box:.....50&10@50&10&5%
Parallel—
Fisher & Norris Double Screw.....15&10%
Stephens'.....25@30%
Parker's.....20@25%
Wilson's.....55%
Howard's.....40%
Bonney's.....40&10%
Millers Falls.....40@40&10%
Trenton.....40&5@40&10%
Merrill's.....15@20%
Sargent's.....60&10&5%
Backus and Union.....40%
Double Screw Leg.....15&10%
Prentiss.....30@25%
Simpson's Adjustable.....40%
Moore's.....20%
Massey Quick Action.....20 @ 25 %
Saw Filers—
Bonney's, Nos. 2 & 3, $15.00.....40&10%
Stearn's.....33⅓&10@33⅓&10&10%
Stearn's Silent Saw Vises.....33⅓@35%
Sargent's.....60%&10%
Hopkins'.....₩ doz $17.50, 10%
Reading.....40&10%
Wentworth.....20&10%
Miscellaneous.
Combination Hand Vises.....₩ gr $42.00
Cowell Hand Vises.....30%
Bauer's Pipe Vises.....10%
Cincinnati.....25&10%
Enterprise Pipe Vises, each.....$3.00
Massey Combination Pipe.....40 %

Wads—Price per M.

U.M.C.&W.R.A.—B. E., 11 up...	68¢	Dis. 30&3
U.M.C.&W.R.A.—B. E., 9@10...	82¢	
U.M.C.&W.R.A.—B. E., 8.....	96¢	
U.M.C.&W.R.A.—B. E., 7.....	$1.10	
U.M.C.&W.R.A.—P. E., 11 up..	1.15	
U.M.C.&W.R.A.—P. E., 9@10..	1.50	
U.M.C.&W.R.A.—P. E., 8.....	1.70	
U.M.C.&W.R.A.—P. E., 7.....	1.80	
Eley's B. E., 11 up.....	$1.70@$1.75	
Eley's P. E., 11@10.....	3.00@ 3.25	

Wagon Boxes—See Boxes, Wagon.

Washer Cutters—See Cutters Washer.

Wagon Jacks—See Jacks, Wagon.

Ware, Hollow, Enameled, &c.
Cast Iron, Hollow—
Stove Hollow-Ware—
Ground.....60&10%
Unground.....60&10&10%
White Enameled-Ware—
Maslin Kettles.....75@75&5%
Boilers and Saucepans.....60@60&5%
Tinned Boilers and Spans.....60@60&5%
Rustless Hollow-Ware.....50@50&5%
Gray Enameled-Ware—
Stove.....50%
Maslin Kettles.....5&10&10%
Boilers and Saucepans.....40&5%
Enameled—
Agate and Granite Ware, list Jan. 1, 1889.....33⅓&10%
Ironclad Enameled Ware...dis 33⅓&10%
Kettles—
Galvanized Tea-Kettles—

Inch....	6	7	8	9
Each....	55¢	60¢		75¢

Standard Fiber—

	Per Dozen. Plain.	Dec'r'd
Wash-Basins, 10¼ in.	$2.00	$2.25
Wash-Basins, 12 in.	2.25	2.75
Keelers, 11¼ in.		4.0C
Cuspidors		3.0C
Spittoons, "Daisy," 8 in....	4.00	4.5C
Peck Measure	4.00	
Half-peck Measure	2.50	

See also Pails.
Indurated Fiber—25%
Spittoons, No. 2, ₩ doz.....$3.40
Basins, Ringed, ₩ doz., No. 2.....$3.00
Washtubs, Nested, Nos. 0, 1, 2 and 3 (4 pieces), ₩ nest.....$7.50
Keelers Nested, Nos. 1, 2, 3 and 4 (4 pieces), ₩ nest.....$2.90
Butter Bowls 15, 17 and 19-inch (3 pieces), ₩ nest.....$1.70
Liquid Measures, pt., qt., 2 qt. and funnell (4 pieces) ₩ set.....$1.00
See also *Pails.*
Silver Plated, Hollow—
4 mo. or 5 % cash in 30 days.
Reed & Barton..... } 40&5%
Meriden Britannia Co..... }
Simpson, Hall, Miller & Co..... }
Rogers & Brother..... }
Hartford Silver Plate Co..... } 40&5&5%
William Rogers Mfg. Co..... }

Washers—

Size hole.....	5-16	¼	½	¾ to 1¾
Washers.....	6	5	3.50¢	3

In lots less than 200 ℔, ₩ ℔, add ¼¢, 5-℔ boxes 1¢ to list.

Wedges—
Iron.....₩ ℔ 3½¢
Steel.....₩ ℔ 3½¢

Weights, Sash—
Solid Eyes.....₩ ton $18@$19

Well Buckets, Galvanized—See Buckets, Well, Galvanized.

Wheels, Well.
8 in., $2.25; 10 in., $2.70; 12 in., $3.3

Wire and Wire Goods—
Iron—
Market.
Br. & Ann., Nos. 0 to 18.....80%
Cop'd, Nos. 0 to 18.....77½%
Galv., Nos. 0 to 18.....70@70&10%
Tin'd, Tin'd list Nos. 0 to 18.70@70&10%
Stone,
Br. and Ann'd, Nos. 16 to 18.....80%
Bright and Ann'd, Nos. 19 to 26..80&5%
Br. and Ann'd, Nos. 27 to 36...82½&5%
Tinned.....
Tinned Broom Wire .18 to 21, ₩ ℔. 4½¢
Galvanized Fence, Nos. 8 and 9. 70&10%
Brass, list Jan. 18, 1884..... 40%
Copper, list Jan. 18, 1884.....40%
Annealed Wire on Spools.....60%
Malin's Steel and Tin'd on Spools.....60%
Malin's Brass and Cop. on Spools.....50%
Tate's Spooled, Tin'd & Annealed..60&5%
Tate's Spooled Cop. and Brass.....50%
Cast Steel Wire.....50%
Stubs' Steel Wire .....$6.00 to 8, 30%
Steel Music Wire, 12 to 30...60@70¢ ₩ ℔
Wire Clothes Lines, see Lines.
Wire Picture Cord see cord.

Bright Wire Goods—
Standard list.....55%

Wire Cloth and Netting.
Painted Screen Cloth, good quality ₩ 100 sq. ft., $1.40
Galvanized Wire Netting.....70&10@75%

Wire, Barb.—Prices unsettled. See Trade Report.

Wire Rope—See Rope, Wire.

Wrenches—
American Adjustable.....40%
Baxter's Adjustable "S".....40&10@50%
Baxter's Diagonal.....40&10@50%
Coes' Genuine.....50@55
Coes' "Mechanics'".....50&10&5%
Girard Standard.....65&10%
Lamson & Sessions' Engineers'..60&10%
Lamson & Sessions' Standard...70&10%
P. S. & W. Agricultural.... } 75&10@
Girard Agricultural..... } 70&10&5%
Lamson & Sessions' Agric'l.. }
Bemis & Call's
Pat. Combination.....35%
Merrick's Pattern.....35%
Brigg's Pattern.....35%
Cylinder or Gas Pipe.....40&5%
No. 3 Pipe.....40&10%
Aiken's Pocket (Bright).....$6.00, 50&10%
The Favorite Pocket.....₩ doz $4.00, 40%
Webster's Pat. Combination.....35%
Boardman's.....20&10%
Always Ready.....35&5%
Alligator.....50%
Donohue's Engineer.....30&10%
Acme, Bright.....50&5%
Acme, Nickeled.....40&5%
Hercules.....70%
Walker's.....55&5%
Diamond Steel.....55&5%
Cincinnati Brace Wrenches.....25&10%
Tafts' Vise Wrench.....55&10&5%

Wringers. Clothes—
Am. Wringer Co.'s list, July 15, 91..2% cash
Colby Wringer Co., list Sept. 1, '91..2% cash
Lovell Mfg Co., list Jan 1, 1892..2% cash
Peerless Mfg. Co, list Feb., 1892..2% cash

Wrought Goods—
Staples, Hooks, &c., list Jan. 12, 1880. 55@55&5%

PAINTS, OILS AND COLORS.—Wholesale Prices.

Animal and Vegetable Oils.

Linseed, City, raw..per gal.	37	@	..
Linseed, City, boiled.....	40	@	..
Linseed, Western, raw.....	35	@	36
Lard, City, Extra Winter..	57	@	58
Lard, City, Prime.....	..	@	57
Lard, City, Extra No. 1.....	44	@	45
Lard, City, No. 1.....	40	@	42
Lard, Western, prime.....		@	56
Cotton-seed, Crude, prime.	25	@	..
Cotton-seed, Crude, off grades.....	23½	@	23¼
Cotton-seed, Summer Yellow, prime.....	29	@	..
Cotton-seed, Summer Yellow, off grades.....	27½	@	28¼
Sperm, Crude.....	70	@	71
Sperm, Natural Spring.....	67	@	70
Sperm, Bleached Spring....	72	@	75
Sperm, Natural Winter.....	73	@	76
Sperm, Bleached Winter...	78	@	81
Whale, Crude.....	..	@	45
Whale, Natural Winter.....	54	@	55
Whale, Bleached Winter...	57	@	58
Whale, Extra Bleached....	59	@	60
Sea Elephant, Bleached Winter.....	62	@	63
Menhaden, Crude, Sound...	30	@	32
Menhaden, Crude, Southern	..	@	..
Menhaden, Light Pressed..	37	@	38
Menhaden, Bleached W'ter.	38	@	39
Menhaden, Extra Bleached	40	@	42
Tallow, City, prime.....	44	@	45
Tallow, Western, prime....	42½	@	43
Cocoanut, Ceylon.....	5¾	@	5¾
Cocoanut, Cochin.....	6½	@	6¾
Cod, Domestic.....	38	@	40
Cod, Foreign.....	42	@	44
Red Elaine.....	34	@	36
Red Saponified.....₩ ℔	4½	@	5
Bank.....per gal	35	@	36
Straits.....	36	@	37
Olive, Italian, bbls.....	60	@	63
Neatsfoot, prime.....	50	@	60
Palm, prime, Lagos....₩ ℔	6	@	6¼

Mineral Oils.

Black, 29 gravity, 25 @ 30 cold test.....per gal	7	@	7¼
Black, 29 gravity, 15 cold test.....	8	@	8½
Black, 29 gravity, summer.	6	@	6½
Cylinder light filtered.....	15	@	
Cylinder, dark, filtered....	12	@	15
Paraffine, 23½ @ 24 gravity.	13½@		14
Paraffine, 25 gravity.....	12½@		13
Paraffine, 28 gravity.....	3	@	⅓
Paraffine, red, 23½@24 gr'ty	13	@	15

Paints and Colors.

Barytes, Foreign, ₩ ton.	$22.00	@	$24.00
Barytes, Amer. floated...	30.00	@	32.00
Barytes, Amer. No. 1....	19.00	@	20.00
Barytes, Amer. No. 2.....	13.00	@	16.00
Barytes, Amer., No. 3....	11.00	@	12.00
Blue, Celestial.....₩ ℔	6	@	8
Blue, Chinese.....	40	@	50
Blue Prussian.....	35	@	40
Blue, Ultramarine.....	8	@	25
Brown, Spanish.....	½@		1
Brown, Vandyke, Amer..	3	@	3½
Brown, Vandyke, English	6	@	8
Carmine, No. 40, in bulk.	3.10	@	..
Carmine, No. 40, in boxes or barrels.....	3.20	@	.
Carmine, No. 40, in ounce bottles.....	4.20	@	
Chalk, in bulk.....₩ ton.	2.00	@	.05
Chalk, in bbls..₩ 100 ℔.	33	@	40
China Clay, English.....			
₩ ton.	18.00	@	18.00
Cobalt Oxide, prep'd.....	9.00	@	11.00
Cobalt Oxide, black..... lots 100 ℔.	2.50	@	....
Cobalt, Oxide, black..... less 100 ℔.	2.65	@	2.90
Green, Paris, in bulk.....	14	@	15½
Green Paris, 170 @ 175 ℔ kegs.....	14½@		15¾
Green, Paris, small pack.	16	@	21¾
Green, Chrome, ordinary	6	@	12
Green, Chrome, pure....	22	@	25
Lead, Eng., B.B. white....	8½@		10
Lead, Amn. White, dry or in oil:			
Kegs, lots less than 500 ℔....	7¼	@	7¾
Kegs, lots 500 ℔ to 5 tons....	6¾	@	7
Kegs, lots 5 tons to 12 tons..	6¾	@	6¾
Kegs, lots 12 tons and over..	6¼	@	6¾
Lead White in oil 25 ℔ tin pails add to keg price.....		@	⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price		@	1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price		@	2½
Lead, Red, bbls. and ¼ bbls....	6¼	@	7¼
Lead Red, kegs.....	6¼	@	7¼
Litharge, kegs.....	6¼	@	7¼
Litharge, bbls. and ¼ bbls....	6½	@	7¼

TERMS, &c.—Lead and Litharge.—On lots of 500 ℔ or over, 60 days' time or 2½ % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle.....	1.35	@	1¾
Ocher, French Washed....	1½@		2¼
Ocher, German Washed....	1½@		2
Ocher, American.....	½@		1½
Orange Mineral, English...	8½@		9
Orange Mineral, French....	10	@	10½
Orange Mineral, German ..	8½@		09
Orange Mineral, American.	8	@	8½
Paris White, English Cliff-stone.....	1.00	@	1.15
Paris White, American.....	70	@	75
Red, Indian, English.....	5½@		7
Red, Indian, American....	2	@	6¼
Red, Turkey.....	9	@	14
Red, Tuscan.....	9	@	11
Red, Venetian, American.. ₩ 100 ℔.	1.00	@	1.25
Red, Venetian, English....	1.00	@	1.50
Sienna, Italian, Burnt and Powd.₩ ℔	4	@	5
Sienna, Ital., Burnt Lumps	1½@		2¼
Sienna, Ital., Raw, Powd..	4½@		5½
Sienna, Ital., Raw Lumps..	1½@		2½
Sienna, American, Raw....	1½@		1¾
Sienna, American, Burnt and Powdered.....	1½@		1¾
Tale, French.....	1½@		1½
Tale, American.....	1	@	1¼
Terra Alba, Fr'ch, ₩ 100 ℔	75	@	80
Terra Alba, English.....	80	@	90
Terra Alba, American No. 1	70	@	75
Terra Alba, American No. 2	45	@	50
Umber, Turkey, Bat. and Powd..... ₩ ℔	3½@		4
Umber, Turkey Bat. Ln	2½@		3
Umber, Turkey, Raw and Powdered.....	3½@		
Umber, Turkey, R'w Lmps	2½@		2¾
Umber, Turkey, Bat. Amer.	1½@		1½
Umber, Turkey, R'w Amer.	1½@		1¾
Yellow, Chrome.....	10	@	25
Vermillion, Americ. Lead.	11½@		17
Vermillion, Quicks'er, bulk.	60	@	62
Vermillion, Quicks'er, bags.	61	@	63
Vermillion Quicksilver, smaller pkgs.....	65	@	67
Vermillion English Imported	85	@	90
Vermillion, Imitation, Eng.	8	@	35
Vermillion, Trieste.....	90	@	92½
Vermillion, Chinese.....	92½@		95
Whiting, Common. ₩ 100 ℔	40	@	45
Whiting, Gilders'.....	55	@	65
Zinc, American, dry.....₩ ℔	4½@		5
Zinc, French, Red Seal....	..	@	8½
Zinc, French, Green Seal..	..	@	8½
Zinc, French, V. M. X.....	..	@	7
Zinc, Antwerp, Red Seal...	..	@	7½
Zinc, Antwerp, Green Seal	..	@	8½
Zinc, German, L. Z. O.....	..	@	6½
Zinc, V M. in Poppy Oil, G. Seal, lots of 1 ton and over.....	10½@		11¼
lots less than 1 ton.....	11	@	11¾
Zinc, V. M. in Poppy Oil, Red Seal.....	..	@	..
lots of 1 ton and over....	10	@	10½
Lots of less than 1 ton....	10½@		10¾

Discounts.—French Zinc.—Discounts to buyers of 10- bbl. lots of one or assorted grades, 1 %; 25 bbls, 2 %, 50 bbls, 4 %. No discount allowed on less than bbl. lots.

Colors in Oil.

Black, Drop, Frankfort	25	@	30
Black, Drop, English.....	12	@	15
Black, Drop, Dom stic	7	@	10
Black, Lampblack, best....	20	@	35
Black, Lampblack, Common	7	@	18
Black, Ivory.....	8	@	15
Blue, Chinese.....	35	@	40
Blue, Prussian.....	20	@	45
Blue, Ultramarine.....	12	@	18
Brown, Vandyke.....	7	@	12
Green, Chrome.....	8	@	12
Green, Paris.....	16	@	18½
Sienna, Raw.....	7	@	14
Sienna, Burnt.....	7	@	14
Umber Raw.....	7	@	10
Umber, Burnt.....	7	@	10

Putty.

In barrels and ½ bbls....	.01½@		.01¾
In tubes.....	.01¾@		.01¾
In tin cans.....	.01¾@		.02¼
In bladders.....	.01¾@		.02¼

Spirits Turpentine.

In regular bbls.....	..	@	38½
In machine bbls.....	..	@	40

Glue.

Low Grade.....₩ ℔	8	@	10
Cabinet.....	13	@	14
Medium White.....	15	@	15
Extra White.....	17	@	20
French.....	10	@	22
English.....	10	@	15
Irish.....	13	@	

CURRENT METAL PRICES.

MARCH 9, 1892.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
⅜ to 2 in. round and square.. / 1 to 6 in. x ⅜ to 1 in...	₩ lb 1.90 @ 2.00¢
Refined Iron:	
⅜ to 2 in. round and square. / 1 to 4 in. x ⅜ to 1½ in.... / 4½ to 6 in. x ⅜ to 1 in.	₩ lb 2.00 @ 2.20¢
1 to 6 in. x ¼ and 5-16	₩ lb 2.20 @ 2.40¢
Rods—⅜ and 11-16 round and sq.	₩ lb 2.10 @ 2.30¢
Bands—1 to 6 x 3-16 to No. 12	₩ lb 2.30 @ 2.50¢
"Burden Best" Iron, base price.	₩ lb 3.00¢
Burden's "H. B. & S." Iron, base price	₩ lb 2.80¢
"Ulster"	₩ lb 3.00¢
Norway Bars	3.75 @ 4.00¢
Norway Shapes	4.50 @ 5.00¢

Merchant Steel from Store.

	Per pound
Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots	2¾¢
Best Cast Steel, base price in small lots	8 ¢
Best Cast Steel Machinery, base price in small lots	5 ¢

Sheet Iron from Store.

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	₩ lb 3 @	3½¢
17 to 20	₩ lb 3⅛ @	3⅝¢
21 to 24	₩ lb 3¼ @	3⅝¢
25 and 26	₩ lb 3⅜ @	3¾¢
27	₩ lb 3½ @	3⅞¢
28	₩ lb 3⅝ @	4 ¢
American B. B.	₩ lb 4¢ @ 4¼¢	

Galvanized Sheet Iron.

	B. B.	2d qual.
Nos. 10 to 16	₩ lb 4.20¢	4 ¢
17 to 22	₩ lb 4.60¢	4 30¢
23 to 24	₩ lb 4 90¢	4.70¢
25 to 26	₩ lb 5.30¢	5 ¢
27	₩ lb 5.60¢	5.30¢
28	₩ lb 6 ¢	5.70¢
29 to 30	₩ lb 7 ¢	6.70¢
Genuine Russia, according to assortment	₩ lb 11¼¢ @ 11¾¢	
Patent Planished	₩ lb A, 10¢; B, 9¢	
Craig Polished Sheet Steel	₩ lb, 8¼¢	

English Steel from Store.

Best Cast	₩ lb 15 ¢
Extra Cast	₩ lb 16½ @ 17 ¢
Swaged, Cast	₩ lb 16 ¢
Best Double Shear	₩ lb 15 ¢
Blister, 1st quality	₩ lb 12 ¢
German Steel, Best	₩ lb 10 ¢
2d quality	₩ lb 9 ¢
3d quality	₩ lb 8 ¢
Sheet Cast Steel, 1st quality	₩ lb 15 ¢
2d quality	₩ lb 14 ¢
3d quality	₩ lb 12½¢
R. Mushet's "Special"	₩ lb 48 ¢
" " "Titanic"	₩ lb 20 ¢

METALS.

Tin.

	Per lb
Banca, Pigs	22 @ ..¢
Straits, Pigs	21 @21¼¢
Straits in Bars	23 ¢

Tin Plates.

Duty: 2.2 cents per pound.

Charcoal Plates.—Bright.

Guaranteed Plates command special prices, according to quality.

			Per box.
Melyn and Calland Grade.	IC,	10 x14..	@ $6.50
" " "	IC,	12 x12..	@ 6.75
" " "	IC,	14 x20..	@ 6.50
" " "	IC,	20 x28..	@ 13.00
" " "	IX,	10 x14..	@ 8.50
" " "	IX,	12 x12 .	@ 8.75
" " "	IX,	14 x20 .	@ 8.50
" " "	IX,	20 x28..	@ 17.00
" " "	DC,	12½x17..	@ 6.00
" " "	DX	12½x17..	@ 8.00
Allaway Grade	IC,	10 x14..	@ 6.00
" "	IC,	12 x12..	@ 6.25
" "	IC,	14 x20..	@ 6.00
" "	IC,	20 x28..	@ 12.00
" "	IX,	10 x14..	@ 7.50
" "	IX,	12 x12..	@ 7.75
" "	IX,	14 x20..	@ 7.50
" "	IX,	20 x28..	@ 15.00
" "	DC,	12½x17..	@ 5.50
" "	DX,	12½x17..	@ 7.00

Coke Plates.—Bright.

Steel Coke.—IC,	10 x 14, 14 x 20..	$5.70	@ $5.75
	10 x 20..		@ 8.50
	20 x 28..	11.50	@ 12 00
	IX, 10 x 14, 14 x 20..		@ 7.00
BV Grade.—IC,	10 x 14, 14 x 20..		@ 5.75

Charcoal Plates.—Terne.

Guaranteed Plates command special prices, according to quality.

Dean Grade.—IC,	14 x 20	@ $5.75
	20 x 28	@ 11.00
	IX, 14 x 20	@ 6.50
	20 x 28	@ 13.00
Abecarne Grade.—IC,	14 x 20	@ 5 65
	20 x 28 .. 10.75	@ 11 00
	IX 14 x 20	@ 6 50
	20 x 28	@ 13 00

Tin Boiler Plates.

IXX, 14 x 26	112 sheets	@ $13 38
IXX, 14 x 28	112 sheets	@ 14 00
IXX, 14 x 31	112 sheets	@ 6 00

Copper.

Duty: Pig, Bar and Ingot, 1¼¢; Old Copper, 1¢ ₩ lb. Manufactured (including all articles of which Copper is a component of chief value), 35 % ad valorem.

Ingot

Lake	@ 11¾¢
Ansonia Grade Arizona	@ 11 ¢
Ansonia Grade Casting	@ 10¾¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 5, 1890. Subject to a discount of 10 % @ 20 %, according to size of order.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound. Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30		72	22	22	23	23	24	25	28	30
30	72		22	22	23	23	25	27	31	..
36	96		22	22	23	24	26	30	33	....
36		96	22	22	23	25	27	31	35	....
48	96		22	22	24	26	28	32	....	....
48		96	22	22	25	27	29	33	....	....
60	96		22	23	25	29	34	....	....	....
60		96	22	23	28	....	....	....	....	....
84	96		23	24	....	....	....	....	....	....
84		96	24	25	....	....	....	....	....	....
Over 84 in. wide			25	27	....	....	....	....	....	....

Bolt Copper, ⅝ inch diameter and over, per pound.. 22¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Cold or Hard Rolled Copper 14 oz. ₩ square foot and heavier, 1¢ ₩ lb over the foregoing prices.

Cold or Hard Rolled Copper lighter than 14 oz. ₩ square foot, 2¢ ₩ lb over the foregoing prices.

Copper Bottoms, Pits and Flats.

	Per pound
14 ounce to square foot and heavier	26¢
12 ounce and up to 14 ounce to square foot	27¢
10 ounce and up to 12 ounce	29¢
Lighter than 10 ounce	32¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

10 % discount.

Copper Wash Boul Bottoms.

Tinned ₩ lb 34¢, 10%

Tinning.

Net.

Tinning sheets on one side, 10, 12 and 14 x 48 each 8¢

Tinning sheets on one side, 30 x 60 each 30¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each 12¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.) each 10¢

Tinning sheets on one side, other sizes, per square foot 2½¢

For tinning both sides double the above prices.

Planished Brass and Copper.

Not larger than 30 x 60.

16 oz. and heavier	24¢ ₩ lb
14 oz.	25¢ ₩ lb
12 oz.	27¢ ₩ lb

Seamless Brass Tubes.

Net.

Dec. 16, 1891.

O. G.	N. G.	⅛	¼	⅜	½	¾	1	1¼
8-14	6-12	30	26	23	22	21	20	17
15	13	31	26	24	23	22	21	18
16	14	32	27	25	24	23	22	18
17	15	33	28	26	23	24	23	19
18	16	35	29	27	25	24	23	20
19	17	36	30	28	27	26	25	22
20	18-19	37	32	30	29	28	27	24
21	20	39	34	32	31	30	29	27
22	21	41	35	34	32	31	30	29
23	22	43	37	35	34	33	32	32
24	23	46	39	37	36	34	33	34
25	24	49	42	39	38	37	36	38

Copper Tubes, 3¢ ₩ lb additional.

Copper Bronze and Gilding Tube, 3¢ ₩ lb additional.

Brazed Brass Tubing. To No. 20, inclusive.

Above 5-16 inch to 3 inch, inclusive	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 3-16 inch	1.00
Plain, ⅛ inch	1.50
Fancy Tubing, Brass, to No. 20, inclusive	45¢ ₩ lb
Bronze Tubing, 3¢ ₩ lb more than Brass.	
Discount from list	30 @ ..%

Roll and Sheet Brass.

(Brown & Sharpe Standard Gauge.)

Common High Brass: Wider than and including	in. 2 / 10	in. 10 / 12	in. 12 / 14	in. 14 / 16	in. 16 / 18	in. 18 / 20	in. 20 / 22	in. 22 / 24
To No. 20, inclusive	.21	.22	.23	.25	.27	.29	.31	.33
Nos. 21, 22, 23 and 24	.22	.23	.24	.26	.28	.30	.32	.34
Nos. 25 and 26	.22½	.23¼	.24½	.27	.29	.31	.33	.35
Nos. 27 and 28	.23	.24	.25	.28	.30	.32	.34	.36

Common High Brass: Wider than and including	in. 24 / 26	in. 26 / 28	in. 28 / 30	in. 30 / 32	in. 32 / 34	in. 34 / 36	in. 36 / 38	in. 38 / 40
To No. 20, inclusive	.36	.39	.42	.46	.50	.55	.60	.65
Nos. 21, 22, 23 and 24	.37	.40	.43	.47	.51	.56	.61	.66
Nos. 25 and 26	.38	.41	.44	.48	.52	.57	.63	.71
Nos. 27 and 28	.39	.42	.45	.49	.53	.58	.65	.75

Discount from List 10 % to 25 %.

Brass and Copper Wire.

List January 17, 1884.

Numbered by Stubs' gauge.	Soft & hard high brass.	Spring high brass.	Low brass.	Copper.
All Nos. to No. 16, inclusive	$0.22	$0.24	$0 26	$0.30
No. 17 and No. 18	.23	.25	.27	.31
No. 19 " " 20	.24	.26	.28	.32
No. 21, or 0.032 diam	.26	.27	.29	.33

Discount 10 % to 25 %.

Fine Numbers.

Numbered by London gauge.	Brass.	Spring high brass.	Low brass.	Copper.
No. 22	$0 26	$0.28	$0 30	$0.34
No. 23	.28	.30	.32	.36
No. 24	.30	.32	.34	.38
No. 25	.32	.34	.36	.40
No. 26	.35	.37	.39	.43
No. 27	.38	.40	.42	.46
No. 28	42	.44	.46	.51
No. 29	.45	.47	.49	.54
No. 30	.48	.50	.52	.62
No. 31	.51	.53	.55	.67
No. 32	.55	.57	.59	.73
No. 33	.59	.61	.63	.82
No. 34	.64	.66	.68	.95
No. 35	.70	.72	.74	1.30
No. 36	.76	.78	.80	1.50
No. 37	1.00	1.02	1.04	1.70
No. 38	1.30	1.32	1.34	2.00
No. 39	2.00	2.02	2.00	2.25
No. 40	2.60	2.62	2.60	3.75

— % discount.

Spring Wire, 2¢ ₩ lb advance.

Copper Belt and Hose Rivets and Burrs.

	Per lb		Per lb.
No. 5	49¢	No. 11	56¢
No. 6	49¢	No. 12	58¢
No. 7	49¢	No. 13	60¢
No. 8	50¢	No. 14	65¢
No. 9	52¢	No 15	70¢
No 10	54¢		

60 % @ 10 % discount.

Tobin Bronze—Rods.

Drawn Rods for Bolts, Forgings, &c.

¼ to ⅜ inch inclusive	17¢ ₩ lb
Over ⅜ to 3½ inches inclusive	16¢ ₩ lb
Over 3½ to 5 inches inclusive	17¢ ₩ lb

Piston Rods, Finished True, Smooth and Straight.

¼ to ⅜ inch inclusive	18¢ ₩ lb
Over ⅜ to 2 inches inclusive	17¢ ₩ lb
Over 2 to 3½ inches inclusive	18¢ ₩ lb
Over 3½ to 5 inches inclusive	19¢ ₩ lb

Spelter.

Duty: Pig, Bars and Plates, $1.50 ₩ 100 lb.

Western Spelter	5½¢
Bertha (pure)	5¾¢

Zinc.

Duty: Sheet, 2½¢ ₩ lb.

600 lb casks	7¼¢
Per lb	7¾¢

Lead.

Duty: Pig, $2 ₩ 100 lb. Old Lead, 2¢ ₩ lb. Pipe and Sheets 2½¢ ₩ lb.

American Pig	4¼¢
Bar	5¼¢
Pipe, subject to discount 20 %	6¼¢
Tin-Lined Pipe, subject to discount 20 %	15¢
Block Tin Pipes, subject to discount 20 %	37½¢
Sheet, subject to discount 20 %	7¢

Old Lead in exchange, 3½¢ ₩ lb.

Solder.

½ @ ½ (Guaranteed)	14¢
No. 1	11¼¢
Extra Wiping	11¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson	₩ lb 16 @ .. ¢
Hallett's	" .. @ 13 ¢

ALUMINUM.

Prices Per Ton.

Duty: 15 cents per pound.

Over 98 % pure	₩ lb .75
94 % @ 98 % pure	₩ lb .65

Old Metals.

Prices Paid in New York.

Heavy Copper	₩ lb 10 ¢
Light Copper	₩ lb 9 ¢
Heavy Brass	₩ lb 7 ¢
Light Brass	₩ lb 6 ¢
Lead	₩ lb 3½¢
Tea Lead	₩ lb 3½¢
Zinc	₩ lb 2½¢
No. 1 Pewter	₩ lb 14 ¢
No 2 Pewter	₩ lb 7 ¢
Wrought Scrap Iron	₩ gross ton $17.00
Heavy Cast Scrap	₩ gross ton 10.00
Stove Plate Scrap	₩ gross ton 7.00
Burnt Iron	₩ gross ton 5.00